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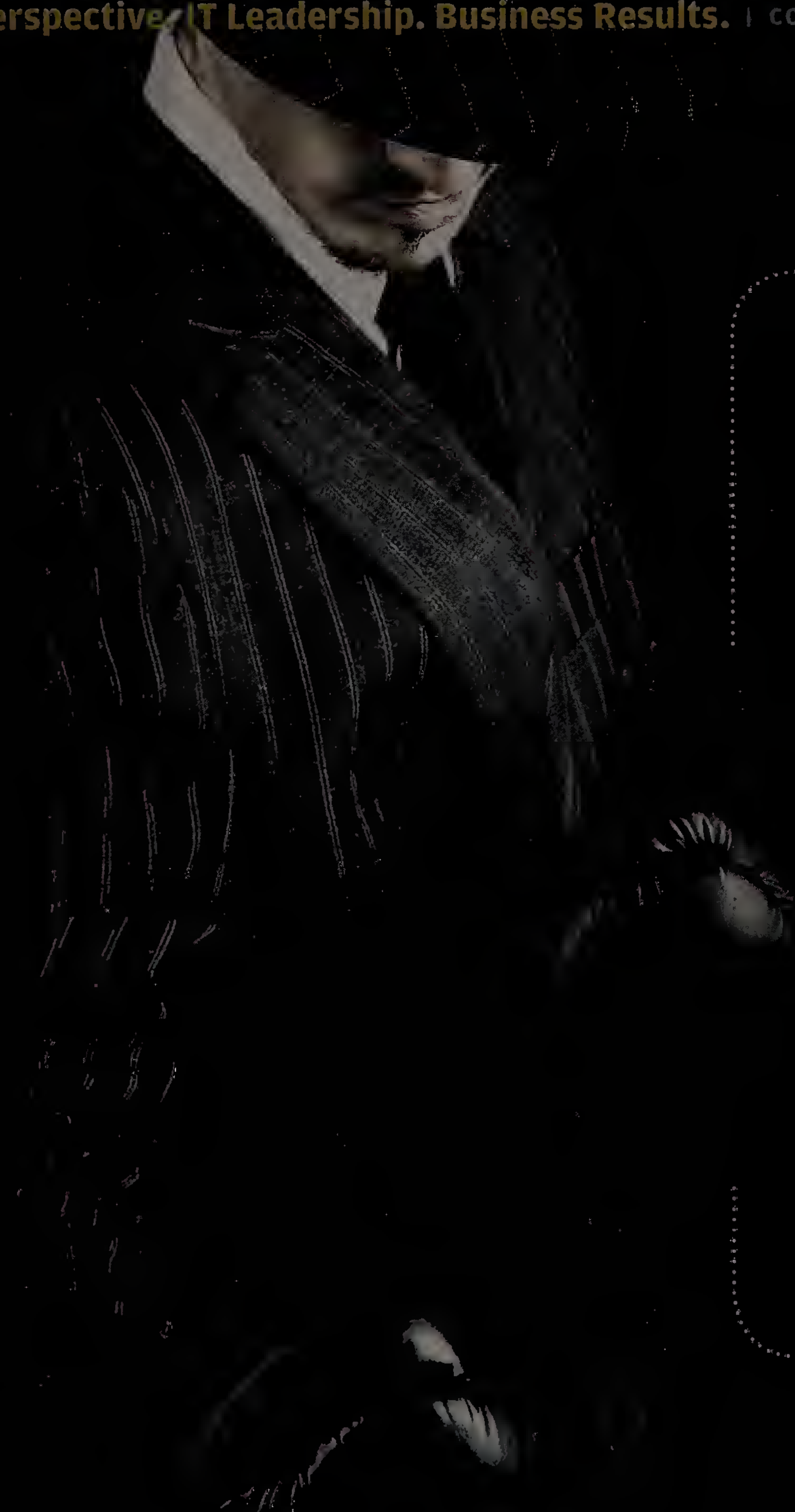
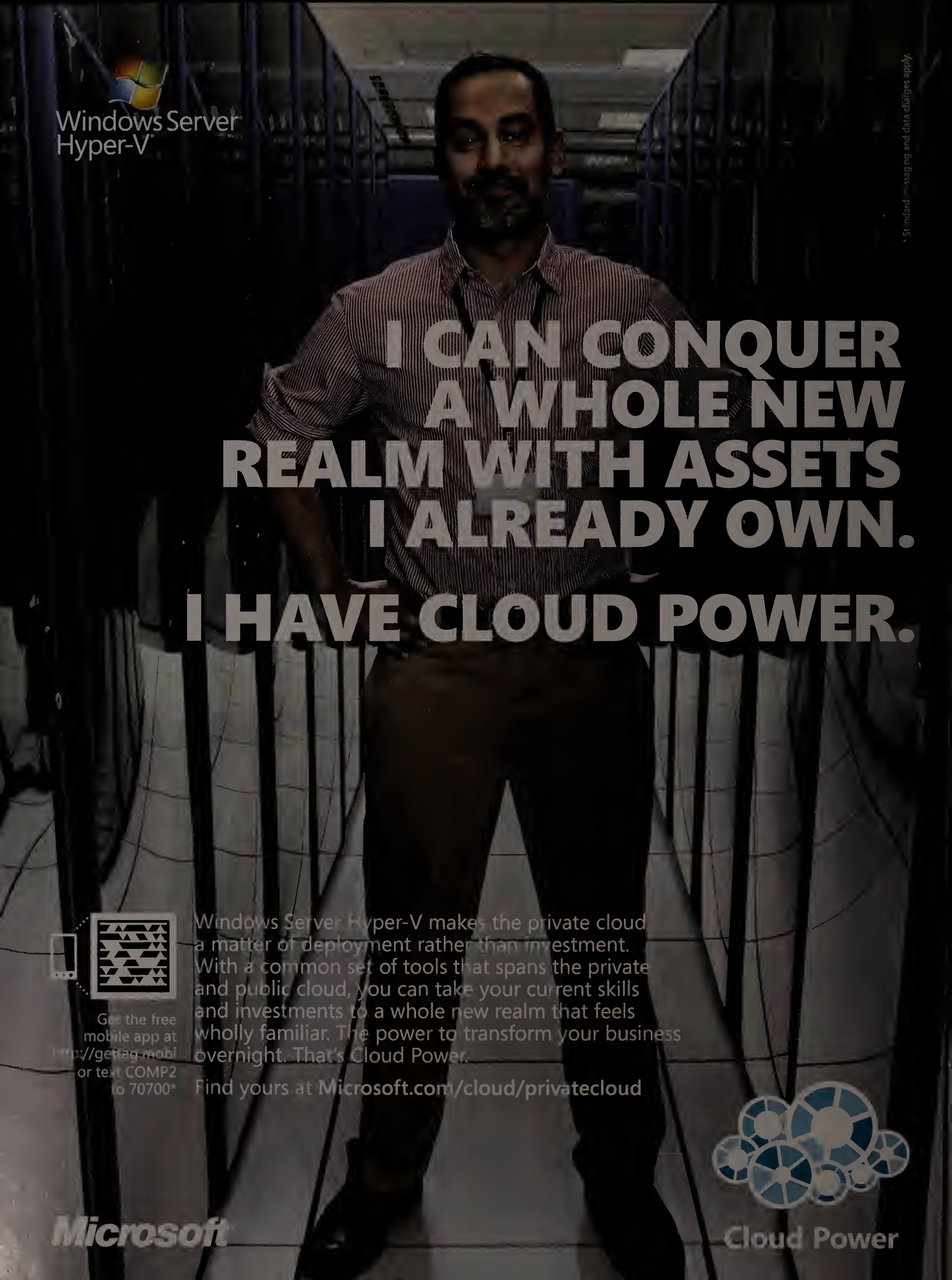


BETTER DEALS

IT managers are in a strong position to negotiate with software vendors and get more for their money.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COVER STORY

New Strategies for Better Deals

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Fresh Insights

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Great Ideas

HeadsUp

A new, 10-petaflop supercomputer will speed up analysis of the effects of earthquakes. Shown above is highway damage from the 1989 Loma Prieta earthquake in Emeryville, Calif.

SANBEIJI / JOE LEWIS / FLICKR

SUPERCOMPUTING

Scientists Race to Simulate Earthquakes

THE RUSH to build more-powerful supercomputers is part of a larger race to solve some of mankind's biggest problems. One person on the front line of that effort is Thomas Jordan, director of the Southern California Earthquake Center.

"We are very concerned about the current state of the faults in Southern California," said Jordan, who described the San Andreas fault as "locked and loaded and ready to roll" with a sizable earthquake.

Using a supercomputer called Jaguar at Oak Ridge National Laboratory, Jordan's team has been running simulations of how an earthquake might affect Southern California. Running at 1.75 petaflops, Jaguar is the world's second-fastest supercomputer.

But now Jordan is preparing his applications to run on Blue Waters, a 10-petaflop system that's being built by IBM for use late next year at the National Center for Supercomputing Applications at the University of Illinois at Urbana-Champaign.

An application with a runtime of 4,000 hours per processor on Jaguar could be completed in just 770 hours on Blue Waters, Jordan said at the SC10 supercomputing conference in New Orleans last month.

There is urgency to Jordan's need for more computing power: Experts estimate that there's a 99% chance of a magnitude 6.7 or greater earthquake during the next 30 years in California.

It could be years before that happens, said Jordan, but "I can tell you, all the seismologists are very nervous."

– Patrick Thibodeau

SECURITY MONITOR

USB Devices Guilty in Many Malware Attacks

One in every eight malware attacks occurs via a USB device, often targeting the Windows AutoRun function, according to Czech security vendor Avast Software.

The company reported that of the 700,000 recorded attacks on computers in the Avast user community during the last week of October, 13.5% came via USB devices such as flash drives.

AutoRun alerts computer users when a new device is connected and helps them choose which application should run the new files.

"AutoRun is a really useful tool, but it is also a way to spread more than two-thirds of current malware," said Avast virus analyst Jan Sirmer. Cybercriminals are taking advantage of people who use USB flash drives to share large files with friends or transfer files at their workplaces, Sirmer said.

Infected USB devices – which can include portable gaming units, digital cameras, mobile phones or MP3 players – start executable files that invite a wide array of malware into host computers. The incoming malware copies itself into Windows and can replicate itself each time the computer is started.

Avast urged users not to boot up PCs that already have USB devices attached, because the malware will load before some antivirus programs do.

– ANTONY SAVVAS, COMPUTERWORLD U.K.

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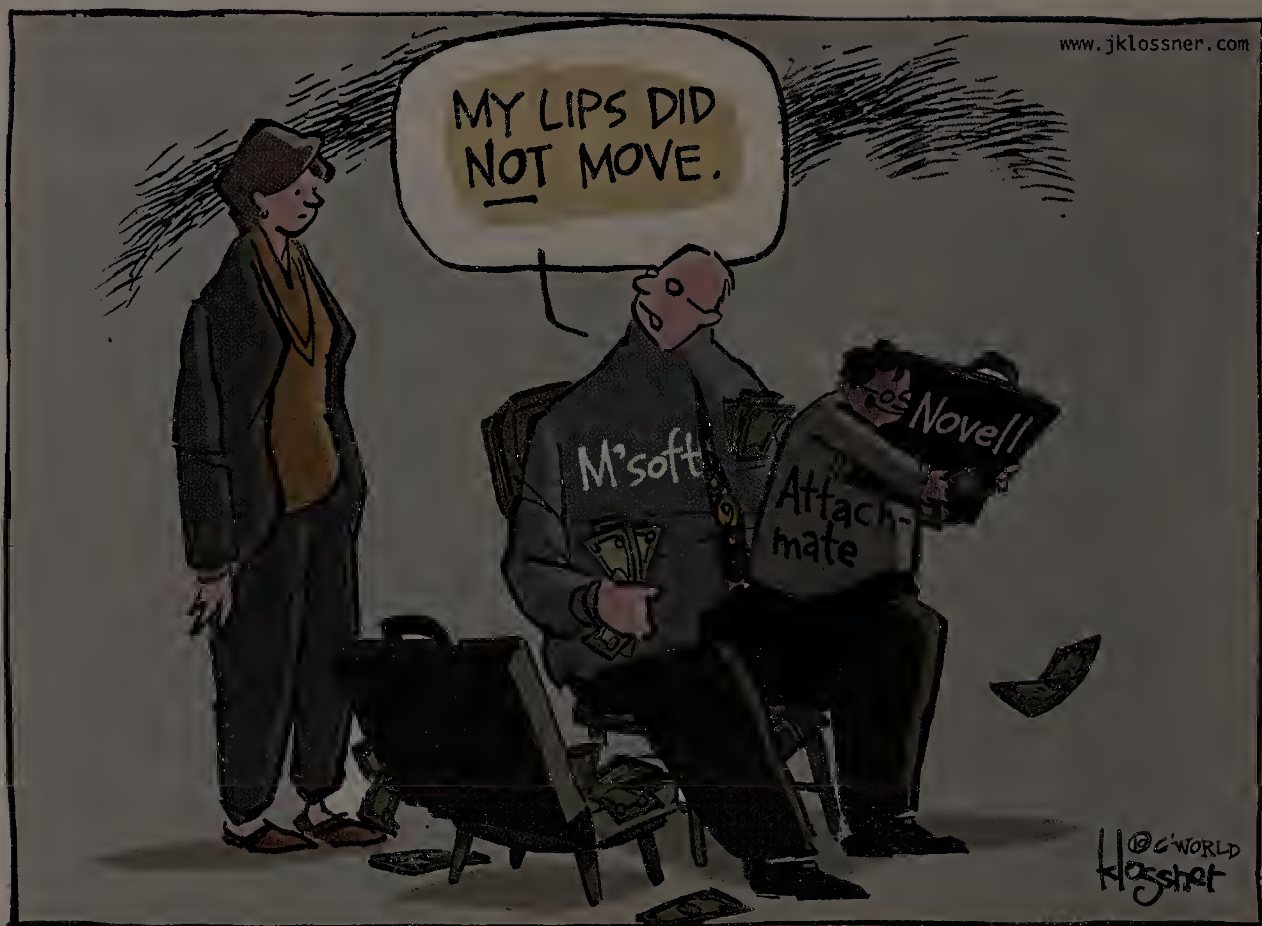
BETWEEN THE LINES
By John Klossner



THINK TANK

Web Creator Un-friends Social Networks

SIR TIM BERNERS-LEE, who is credited with creating the World Wide Web, last month warned that social networking sites and efforts to prioritize Internet traffic threaten the Web's universality.

In an essay published in *Scientific American*, Berners-Lee criticized Apple, Facebook, Verizon, Google and Internet service providers for jeopardizing open access to Web content. "If we, the Web's users, allow these and other trends to proceed unchecked, the Web could be broken into fragmented islands. We could lose the freedom to connect with whichever Web sites we want," he wrote.

Berners-Lee said the problem with social networking sites such as Facebook and LinkedIn is that "each site is a silo, walled off from the others." While the pages may show up on the Web, the underlying data is stuck within a closed world, he argued.

He criticized Apple for keeping its music within the proprietary iTunes store instead of in an open Web marketplace.

"The more this kind of architecture gains widespread use ... the less we enjoy a single, universal information space," he said.

Berners-Lee called for legislation to protect Net neutrality and criticized as "bizarre" a suggestion by Google and Verizon that Net neutrality shouldn't apply to mobile phones.

If the basic principles of the Web are upheld — including support for open standards, making data openly shareable, and Net neutrality — the Web promises some "fantastic future capabilities," he said.

Berners-Lee cited "linked data" as an example of one of those promising capabilities. Tagging individual pieces of data would allow applications to read and manipulate more information. That could, for example, help scientists more easily collect all data on a certain subject, he said.

"The goal of the Web is to serve humanity," Berners-Lee wrote. "We build it now so that those who come to it later will be able to create things that we cannot ourselves imagine."

– Nancy Gohring, IDG News Service

Micro Burst

In a survey of 109 users of Oracle applications,

42%

of the respondents said they're dissatisfied with the quality of Oracle's support.

HUMAN FACTORS

Programmers At High Risk Of Insomnia

Computer programmers have an especially hard time falling asleep, which leads to a lower quality of life, according to a small study of 91 software engineers in India.

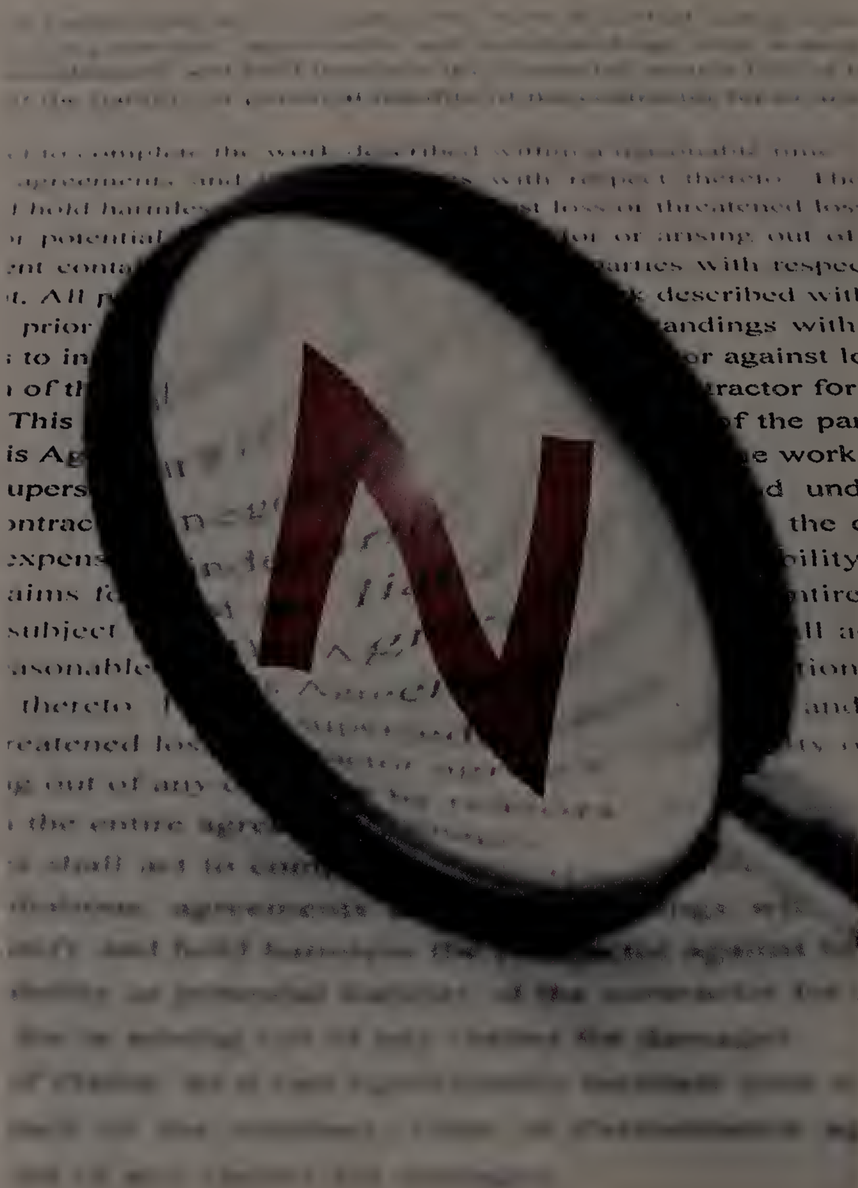
Insomnia is bad news for software engineers' mental health and deserves greater attention, warned researchers Sara Sarrafi Zadeh and Khyrunnisa Begum at the University of Mysore in India.

In a study published in the journal *Applied Research in Quality of Life*, the authors found that 56% of the participants had mild or severe insomnia, compared to 23% in the general population. In contrast to what other studies have shown, younger software engineers were more likely to be insomniacs than their older counterparts.

Insomnia can cause daytime problems such as fatigue, irritability, memory impairment and loss of productivity. Left untreated, it has also been linked to severe depression and coronary heart disease.

Because software engineers are at high risk for health problems caused by insomnia, the authors called for sleep assessments during medical checkups, and employer-provided "lifestyle management programs" that teach habits conducive to better sleep.

– MITCH BETTS



Users Seek Clues On Novell Deal

Customers are mostly in the dark about the future of Novell's products following the company's sale to Attachmate and a Microsoft-led consortium. By Patrick Thibodeau

THE COMPLEX $2.2 billion sale of Novell Inc. and its copyrights to Attachmate Corp. and a consortium led by Microsoft Corp. has left users wondering about the future of the combined company's product lines, and about Microsoft's still-unclear role in the transaction.

Bob Schaber, network operations manager for the Dublin, Ohio, city government, said his biggest questions about the deal focus on which Novell products Attachmate will continue developing and what its long-term plans for those products will be.

The city government runs Novell's Open Enterprise Server and its Teaming and Conferencing applications.

"We're really comfortable with their product lines and how well they work," Schaber said. "As long as they keep developing them the way they have in the past, we will keep using them."

Schaber added that he also wants to know the implications of Microsoft's involvement in the acquisition. Novell and Attachmate said that CPTN Holdings LLC, a consortium of as-yet unidentified technology companies organized by Microsoft, is paying $450 million for 882 Novell patents as part of the acquisition.

Microsoft acknowledged its role in the deal but declined to offer more than a vague statement from Horacio Gutiérrez, the software vendor's deputy general counsel.

In a terse message posted on its Web site, Novell said that its copyrights for the Unix operating system are not part of the sale to CPTN, but it didn't elaborate.

In a blog post, Gartner Inc. analyst Earl Perkins pointed to the uncertainty of Microsoft's role and noted, "Time (and SEC filings) will provide a clearer answer. It makes open-source and Linux users of all stripes nervous, though, until we know more."

> "As long as they keep developing [Novell products] **the way they have in the past**, we will keep using them.
>
> [illegible]
> NETWORK OPERATIONS MANAGER, CITY OF DUBLIN, OHIO

An Attachmate spokesman promised that "current road maps and release schedules [of both Attachmate and Novell products] will stay intact. Our priority is to 'do no harm' to the successful stand-alone operations of all companies as we integrate."

Attachmate is owned by an investment group led by Francisco Partners, Golden Gate Capital and Thoma Bravo. It sells terminal emulation tools, application integration tools, legacy migration products, and systems and security management software from NetIQ.

Novell, founded in 1979 as a PC maker before shooting to prominence about four years later with the unveiling of its NetWare LAN technology, currently sells collaboration tools, identity management software, directory services, virtualization products and the SUSE iteration of Linux.

Perkins said that he doesn't expect any changes to the Novell and Attachmate product lines in the immediate aftermath of the deal, which is expected to close in the first quarter of 2011. "This technology has been around a long time; they have a big customer base. It's not likely at this particular phase, and probably not for more than a year, that you are going to see any major shifts in what Attachmate is going to do with Novell," he said.

He did offer this advice to Novell users: "Make your feelings known to Attachmate on a variety of topics, not the least of which is ongoing maintenance and support contracts for existing Novell deployments." Perkins noted that maintenance issues typically arise following acquisitions — as they did most recently after Oracle Corp. acquired Sun Microsystems Inc. ♦

***Chris Kanaracus** and **Joab Jackson** of the IDG News Service contributed to this story.*

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Verdict in Oracle-SAP Suit Poses Threat to IT

Customers fear that acrimony could hurt sites using both vendors' software; analysts predict negative repercussions for the third-party support industry. By Jaikumar Vijayan

LAST MONTH'S federal jury verdict awarding Oracle Corp. $1.3 billion in its corporate theft lawsuit against SAP AG could prove harmful to both enterprise users and third-party support providers, analysts and IT executives say.

Oracle filed the lawsuit against SAP in 2007, charging the German vendor's now-shuttered TomorrowNow subsidiary with the electronic theft of "thousands of proprietary, copyrighted software products and other confidential materials" used by Oracle's support organization.

SAP indicated that it will appeal the award, which several analysts called excessive in light of the small size of the TomorrowNow software support business.

"The business that they were in was to fix glitches in [Oracle] software and make some compliance updates," said Paul Hamerman, an analyst at Forrester Research Inc. "They weren't trying to resell any of the software that they were downloading."

Continuing acrimony between Oracle and SAP could cause significant problems for the many large sites that run a mix of products from both suppliers, said John Glanville, IT director at Ideal Stelrad Group Ltd., a U.K.-based heating and boiler company.

"SAP's engagement with Oracle appears to be widening, and yes, this has to be a concern," Glanville said. There is an "ever increasing need" for the products to work together so that IT departments can "develop solutions quicker, more robustly and with infinite scale. Business etiquette has to prevail," he added.

Frank Scavo, managing partner of Strativa Inc., an IT consulting firm in Irvine, Calif., speculated that the excessive damages award could blunt the willingness of third-party support providers to offer the pricing and other advantages they extend today.

"Some of us have been advocating for software customers' rights to receive legitimate third-party support as a counterweight to the OEM's ability to charge unreasonable fees for maintenance," Scavo said.

Ronan Miles, chairman of the U.K. Oracle User Group and director of customer innovation services at BT Group PLC's Global Platforms group, said the verdict should immediately prompt businesses using non-vendor-supplied support services to "ensure that those third parties engage fairly with Oracle."

The 11-day trial in an Oakland, Calif., federal courthouse captivated Silicon Valley with the drama of a battle between the world's two biggest business applications software vendors.

Well-known executives like Oracle CEO Larry Ellison, Oracle co-President Safra Catz and SAP co-CEO Bill McDermott appeared in the witness box. Spectators included an FBI agent who said the agency has "an interest in the case," and Kyle Waldinger, an assistant U.S. attorney based in San Francisco.

SAP in August had already agreed to assume liability for Oracle's copyright theft claims, and in court the company estimated that it owed Oracle $40 million. Ellison testified that SAP should pay up to $4 billion to cover the cost of the stolen software.

The jury was given wide latitude in deciding on the amount of damages to award and apparently bought Oracle's argument that SAP should have to cover the cost of a "hypothetical license" — or whatever it would have had to pay Oracle to license the stolen software at fair market value. ◆

James Niccolai *of the IDG News Service and* **Leo King** *of* Computerworld U.K. *contributed to this story.*

> SAP's engagement with Oracle appears to be widening and **yes, this has to be a concern.**
>
> JOHN GLANVILLE, IT DIRECTOR, IDEAL STELRAD GROUP LTD.

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THE Grill

Dieterich Lawson

This newbie CTO oversees a network that connects doctors and saves lives.

Favorite movie: *Good Will Hunting*

Favorite technology: It's a tie between the Hubble Space Telescope and the Large Hadron Collider.

Favorite vice: StarCraft II

Life's ambition: To go to space for a few days, preferably on a commercial flight. I'm extremely interested in spaceflight, humanity becoming an interplanetary species, and the discovery of aliens, so I aspire to contribute to progress in those areas.

Dream dinner guest: Oscar Wilde

Favorite book: The last book I read was also the best book I've read – Vladimir Nabokov's *Pale Fire*. It's such a beautiful mind trip, and I've never read another book like it.

PHOTOGRAPHY BY SARA FORREST

THE YOUNG *and charismatic chief technology officer at FrontlineSMS:Medic, Dieterich Lawson, 21, is committed to his company's mission of using low-cost mobile technologies to advance healthcare networks in underserved communities. Combining the use of inexpensive cell phones with free, open-source software, Lawson and FrontlineSMS:Medic are helping to better organize healthcare records and connect patients with doctors in rural areas around the world.*

Tell me about FrontlineSMS:Medic. When was the company started, and what are its goals? The project that inspired Medic started in late 2008, when Josh Nesbit, our CEO, went to work at St. Gabriel's Hospital in Malawi. St. Gabriel's is a rural clinic, and many of its patients live 50 or 60 miles away, without access to cars or motorbikes. A 60-mile walk would be difficult under any circumstances, but for someone who is

Continued on page 12

I'm learning, but every day I wake up kind of surprised that I haven't stepped on a proverbial land mine.

Continued from page 10

sick, it can be brutal, potentially deadly. To combat this problem, many clinics have begun training community health workers, or CHWs, who live in these rural communities and provide basic medical care as a proxy for the clinic. Unfortunately, the CHWs have limited supplies and only a few weeks of training and are often as disconnected from the clinics as the patients themselves.

Josh had the idea to give each CHW a cell phone and equip St. Gabriel's with a laptop running FrontlineSMS:Medic, a free and open-source software package that allows users to send and receive text messages from their computers via a USB-connected mobile phone. This simple improvement in communication saved the clinic 2,048 hours of worker time, reduced motorbike fuel costs by $3,000 and doubled enrollment to their tuberculosis treatment program.

Two years later, we've created a collection of software tools that have been deployed in 10 countries and are being used by 1,500 CHWs who serve over 3.5 million patients.

What projects is Medic working on? One of our first projects, PatientView, is a simple and easy-to-use electronic medical record targeting small clinics or single departments that have little support from professional IT staff. Many of these clinics are currently using paper medical records and would benefit from the improved efficiency and reliability of an EMR but do not have the technical staff to maintain one, as they are typically large and complex. To address this problem, PatientView was designed to be easy to set up, easy to maintain and easy to use. Beyond simplicity and usability, PatientView has many mobile features that are useful when working with health workers in the field, like the ability to coordinate SMS to and from the workers, accept forms submitted on mobile phones, and more.

PatientView is a desktop application, and at times we've been criticized for limiting it to offline use only. However, we have found consistently that our partners do not have a reliable enough connection to access a Web application that is hosted remotely and do not have the expertise to maintain network infrastructure and a full Web stack locally.

How will the needs of Medic's users change as this technology develops? One such need involves Internet connectivity in many resource-constrained areas. Currently, we are very focused on SMS technology because it is reliable and available nearly everywhere. But as Internet tech like GPRS becomes more widespread and reliable, our users will want technology that takes advantage of this faster, cheaper connection method. In a similar vein, many of our deployment areas will eventually have stable access to wired Internet and will want to leverage all of the advantages that it can provide.

What is your role at Medic? Technology visionary? Operations manager? My job revolves around defining our software direction and goals, and coordinating the achievement of those goals.

Defining our software goals begins with gathering data and input from many groups of people, including our staff and end users. From these conversations, we work to home in on a set of realistic and attainable features. It's my job to ensure that the goals created represent the best interests of Medic, and that the goals are communicated to our development team.

The second part revolves around ensuring that our development team is operating at peak efficiency and accomplishing the goals that we've established.

How do you measure success? Medic has a research arm, headed by Nadim Mahmud. The job of Medic Research is to oversee studies at our implementation sites, determine our impact and publish the results in peer-reviewed journals.

What are some of the advantages of being a young CTO at a fairly early-stage growth tech company? The main advantage to being younger is having fewer assumptions about what can be done and how to do it. Other than that, I've found that it's mostly a challenge — I'm inexperienced at public speaking and still get stage fright. I don't have shared experiences with many of the people I meet.

I'm learning, but every day I wake up kind of surprised that I haven't stepped on a proverbial land mine. All that being said, though, I also wake up feeling incredibly lucky to have found such a fulfilling and challenging job while I'm still young. I have the rest of my life to be timid.

– Interview by **Sara Forrest**, *a freelance photographer and writer in New York (studio@saraforrestphoto.com)*

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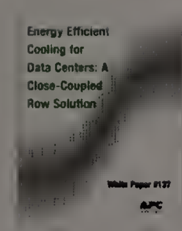

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THORNTON A. MAY

For IT, It's All Going To Be About Processes

IT leaders are expected to anticipate the business's needs, but recent events suggest we often don't know what is actually going on.

ANTICIPATION AND FORESIGHT are critical to IT leadership success. But don't just take my word for it.

When studio Dreamworks SKG was starting up, the CIO told me that the No. 1 responsibility of CIOs in his industry was to "anticipate problems before the business encountered them — to see the wall before the business slammed into it."

The CEO of a West Coast multinational, when asked what he thought the role of the CIO was, replied, "To think of what I think of before I think it, and have it ready to go when I think of it."

But if IT leaders are going to anticipate the way they're expected to, they are going to need a better handle on processes.

At the IT Leadership Academy, we are about a third of the way into a yearlong examination of what *is* known, what *can be* known and what *must be* known about critical business processes in the enterprise. Much of the attention in IT these days seems to be directed at four change vectors: the cloud, mobility, business analytics and social media. But all that good work could be nullified by underperformance in the unsexy but critically important area of process knowledge.

We live in a complex world. Regulators, investors and customers presume that management teams operate with full knowledge of key processes in the enterprise. But several recent events — the BP Deepwater Horizon blowout and the recall of eggs in the wake of the salmonella scare, plus numerous other recalls — suggest that we often don't know what is actually going on.

Our early research data suggests that the full capture and analysis of process knowledge is more the exception than the rule. How can this be?

For decades, we have been automating business processes. Then, in the '90s, we re-engineered the processes we had automated. During the first decade of this millennium, we spent trillions of dollars on ERP, customer relationship management, supply chain and knowledge management systems. And yet, when asked to identify their enterprises' critical processes and evaluate how they're performing, the vast majority of executives couldn't say.

The age of process re-engineering was launched when MIT computer science professor Michael Hammer lobbed a shot across the bow of our industry in his *Harvard Business Review* article "Don't Automate, Obliterate" (July-August 1990). Every consulting firm created a practice around documenting processes, and for a time, processes were the high ground of IT. Then, somehow, they quietly faded from IT consciousness.

The preliminary interviews I have conducted indicate that those of us in IT *know* that we're not as aware of what's actually happening in key processes as we should be. CIOs rightly perceive that they would put their careers at risk if they shed light on the fact that their IT shops are ignorant of their enterprises' processes. Meanwhile, the business executives who oversee key processes believe that they understand how things work, but often their understanding is far removed from how things actually work. That gap is fueling a process bomb that is dangerously close to exploding.

So in addition to all our other responsibilities, IT will have to defuse that process knowledge ignorance bomb. Be careful, and move cautiously.

I welcome readers' thoughts on the state of process knowledge capture, analysis and action in their enterprises and industries. ◆

Thornton A. May is the author of *The New Know: Innovation Powered by Analytics* and executive director of the IT Leadership Academy at Florida State College at Jacksonville. You can contact him at thorntonamay@aol.com.

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NEW STRATEGIES *for* BETTER DEALS

IT managers are in a strong position to negotiate with software vendors and get more for their money.

BY ELISABETH HORWITT

TOUGH ECONOMIC TIMES, and the availability of more software licensing models than ever before, have combined to shift more negotiating power into customers' hands.

But there's a downside: The software-shopping process has grown more complicated. With a slew of complex options to choose from, IT decision-makers have to do more homework than they once did.

Smart IT managers are getting more for their money these days, though. Instead of passively accepting the old perpetual-

license model and vendors' pricing terms, customers are haggling for better deals, says IDC analyst Amy Konary. Some customers are threatening to choose other options — including virtualization, software as a service (SaaS) and open source — if a traditional vendor doesn't meet their demands, she explains.

The economic downturn has also given customers more leverage, says Ray Wang, an analyst at Altimeter Group. Some have gotten maintenance and support fees cut by up to 60%, he says, adding, "This is a great time to buy enterprise software."

Baker Hughes Inc. recently got better terms from several vendors by agreeing to longer-term contracts and by bargaining as an enterprise rather than having each of its divisions negotiate on its own, says Graham Crisp, IT assets manager at the Houston-based global oil-services firm. "We have much more leverage and can get volume discounts by bargaining as a single company with 36,000-plus users instead of eight divisions," says Crisp.

> **We have much more leverage and can get volume discounts by bargaining as a single company instead of eight divisions.**
>
> **GRAHAM CRISP,** IT ASSETS MANAGER, BAKER HUGHES INC.

Enterprises have always been able to cut deals in exchange for larger and longer-term commitments. The big change now is that the customer "has more transparency, flexibility and choice" during negotiations, Konary says.

In addition to providing more pricing options, vendors are becoming more open about what choices they offer, Konary says. Indeed, some are actually using them as marketing tools.

Cloud vendor RightNow Technologies Inc., for example, has been trumpeting a provision in its new cloud services agreement that allows users who sign multiyear deals to cancel at the end of a year for any reason. In addition, customers can buy a pool of "seat months" that they can use on an as-needed basis.

Maintenance is another area where customers are starting to push for fairer deals.

For example, Gartner Inc. recently formed a user group, called the Global IT Council for IT Maintenance, that has issued a "code of conduct" for the way vendors approach maintenance deals. It calls for "reasonable, predictable" percentage ranges for annual maintenance fee increases or reductions, long-term caps on increases, and the ability for customers to stop or alter support at any time for unused products.

Recession or no recession, vendors still play hardball at the negotiating table, of course. They might cut you a deal upfront but also include clauses that hamstring your ability to renegotiate later — such as eliminating volume discounts when you give back licenses, says Wang.

First Steps: Analyze, Streamline

Assessing your software assets and monitoring utilization are crucial first steps for negotiations (and, later, contract compliance audits).

Before sending out requests for proposals, businesses need to analyze their software needs and streamline those needs as much as possible, says Gartner analyst Bill Snyder. He recommends that users answer these two questions: "Is there a cheaper alternative? And do we need all of these features and functions?"

The ability to predict software needs is critical when it comes to long-term negotiations, Snyder says, because once you deploy a vendor's ERP or database system companywide, you're effectively in a monopoly relationship. If you purchase too few licenses, you'll have to buy more later, losing out on volume discounts. If you buy too many, you're paying maintenance and

Continued on page 20

KNOW *your* OPTIONS

Before negotiating with a vendor, figure out what pricing model works best for your organization. Then, if the vendor rep says, "We don't offer that," you can threaten to go to someone who does.

"Pay per seat" is the traditional pricing model. In such arrangements, vendors offer better deals for volume and commitment but generally include penalties for reducing the number of seats before the agreed-upon renewal time. At the very least, customers lose their volume discounts if they give back a significant number of seats, and they have to pay list price for additional seats if they underestimated user demand. However, vendors are starting to be more flexible on this point.

Here's a look at some newer pricing models:

- **Pay per number of concurrent online users.** This is particularly useful for global companies that have multiple groups of employees who work at different times in different locations.
- **Pay for unlimited clients.** The advantage of this type of arrangement is that the customer no longer needs to guess how many licenses it will need in the next year or two, nor does it need to keep track of license usage in case of a vendor audit. Such licenses are pricey, however, and work best when the software will get lots of use, says IDC analyst Amy Konary.
- **Pay per usage.** In this model, vendors typically charge an upfront fee plus a rate that scales up and down according to utilization of a given software package. This option is catching on among companies that are sick of paying one price for a monolithic software suite, such as Office, even if their workers are using only a tiny percentage of the features, Konary says. Pay per usage will potentially enable customers to pay on a highly granular level, not just by application usage but according to who is using which features or software modules and for how long.

Usage-based pricing models have a catch, however: They require IT administrators to spend a lot of time monitoring and recording utilization levels. The more granular the model, the more time-consuming and complex that task will be.

— ELISABETH HORWITT

NEGOTIATING TIPS

Are you preparing to sit down at the negotiating table with an enterprise software vendor? Here are some best practices to employ and some gotchas to avoid.

- **Beware of "buy now and save" bargains that vendors offer at the end of the quarter or year.** They encourage customers to buy software before it's needed, so you can end up paying maintenance and support fees for shelfware.
- **Ask your vendor for rebundling protections** that ensure that you keep your functionality and add-ons when a suite or platform gets repackaged, bundled or unbundled.
- **When negotiating, make sure you involve both an IT person who understands the software and a business person who understands contracts.** And make sure they talk to each other.
- **Don't immediately reduce the number of licenses you hold to reflect a decrease in users.** During a recent workforce reduction, Baker Hughes opted to continue paying maintenance and support costs on expensive software, since it will probably add end users down the road, says Graham Crisp, the company's IT assets director. The other option was to wait and potentially pay higher prices when the new users come online.
- **Negotiate as an enterprise, not as separate divisions.** You have more leverage that way.
- **Talk to analysts, colleagues at other companies and fellow user group members to learn which vendors tend to be more generous and flexible.** If Vendor A is being hard-nosed, mention that Vendor B is offering deals.
- **Don't make decisions based on pricing alone.** An alternative software offering may not have the features and capabilities your users need. Altimeter Group analyst Ray Wang says SaaS offerings typically have about 60% of the features provided by on-premises products – but that figure should go up to 80% within the next two years, he notes.
- **Remember: Linux has some features that Windows and Unix lack, and vice versa.** Don't make a decision based on your personal preferences; figure out which features are critical to your organization, and make your choice on that basis.

– ELISABETH HORWITT

Continued from page 18

support costs for shelfware — software that sits unused.

Anticipating software needs more than a year or two ahead can be tricky, however. For example, 20/20 Companies, a sales-personnel outsourcer, originally purchased 300 end-user licenses for Force.com, Salesforce.com Inc.'s hosted application development software. From there, 20/20 went up to 500 licenses, which it quickly exceeded and expanded to 900. "Edging up means no volume discount," warns Mark Warren, 20/20's acting CIO.

"You absolutely need to figure out your business software goals upfront," says Thomas Jefferson, former vice president of business technology at TMP Directional Marketing LLC. While at TMP, he had monthly planning meetings with the CEO, the CEO's direct reports and several business managers. "We would go over what we're doing, where we're going, and make sure this strategy is reflected in the overall IT road map," says Jefferson.

TMP has been discussing the potential business benefits and cost trade-offs of implementing a document management system, according to Jefferson. (A current TMP IT executive confirms that.) This would cut document access time and improve customer service, but it would also require an expansion of storage and storage-area network capacity and the purchase of additional licenses for storage software, databases and client data access applications, Jefferson notes.

Once TMP assesses what resources the new system will require, it can go to vendors and say, "We're going to need this number of licenses over the next three years. How can you help me do that while taking advantage of today's prices?" Jefferson says.

IT decision-makers also need to get a handle on their own software installations — not just what's out there, but who uses it when, and how often. This is particularly critical if you're thinking about going with a pay-per-usage pricing model.

Over the past few years, industry bodies such as the international standards group ISO have collaborated on a set of software asset management best practices for reducing software costs. Those practices include eliminating or reallocating underused software licenses, eliminating overhead associated with management and support, and ensuring compliance during vendor license audits.

Effective software asset management involves regularly inventorying software assets, determining usage and comparing what's installed with what the license agreement entitles you to, says Snyder. Companies that do this "are in a powerful position to drive down software costs," he adds.

Unfortunately, many IT staffs lack documentation for the company's software assets, according to Snyder. Software purchases are often made by individuals or business groups, with limited or no IT oversight. This limits IT's ability to negotiate volume discounts, and vendors exploit that weakness, Snyder says.

Using Asset Management Tools

Organizations are increasingly using IT asset management and software compliance tools to get a handle on their software assets and purchases.

For the past few years, Baker Hughes has been using CA Inc.'s Desktop and Server Management (DSM) tool to monitor software assets on some 30,000 machines worldwide so IT can determine whether the numbers are in compliance with vendor agreements. "We initially found that we were overlicensed," says Crisp. "This is what we expected, because people were buying

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MITSloan
Management Review

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THE NEW INTELLIGENT ENTERPRISE

The New Role of IT

Ten years ago, executives looked to IT for technical solutions to support business units. Today, analytics has dramatically changed that function, says **Beth Holmes**, IT Analytics Lead for Monsanto. Now IT managers are sought after for the answers they can provide to build competitive advantage and guide strategic decision making.

From the Editor-in-Chief, *MIT Sloan Management Review*

With a Ph.D. in plant breeding and genetics and years of information technology project management, Beth Holmes brings the discipline of a scientist to her role as IT Analytics Lead at Monsanto Company, the seed and crop protection chemical company.

In its essence, her job is to answer questions for the company through exploratory analytics. Her group scopes out high-value targets, does cost modeling, looks at sales forecasting, and uses multiple methodologies to aid long-range planning. These can include testing assumptions about the macroeconomic drivers behind the trends in agriculture. "Understanding the possibilities of things that may happen are really critical to our ability to operate profitably," Holmes says.

"Five years ago, people would have viewed analysis as almost synonymous with reporting," she says. But seeing what analytics can do is starting to change what executives ask for. "The work changes the conversation that IT has with the business units," says Holmes. "It changes the perspective of the *value* that IT brings."

Holmes spoke about myth-busting, question-asking, and why the simplest solution is often the smartest with *MIT Sloan Management Review* Editor-in-Chief, Michael S. Hopkins.

Continued on page 2

Continued from page 1

You've said that analytics is about the quest for the best set of leading indicators that you can get to inform your business. Have those indicators changed over the last few years?

Yes, and actually, that's part of the evolution of using analytical capability. If you're running models, then of course you have to not only look at the *results* but also at the *variables* that go into those models: what the relationship is between them, and is that relationship behaving as expected. Those relationships change over time, and it's really the ability to *detect* that change that provides companies with a competitive edge.

We make sure that people are educated on the relationships and assumptions that underpin the models — and that we have the capability to monitor those relationships as well as generate the model results.

Do you find that conventional wisdom in the industry is wrong once you bring models to bear on it?

It's definitely very common to both do a little myth-busting and to confirm conventional wisdom. Both things occur on a regular basis. But the bigger point is that even when you either dispel a myth or you confirm conventional wisdom, you have to keep in mind that tomorrow that relationship may change.

How has the IT department's relationship to the company changed?

We've always had a really strong R&D effort, but we're seeing an increasing appetite to use analytical methods in every level of our business. We've essentially found our way out of R&D and into the business units. It's exciting to me to see that, because as business units recognize how they impact one another, there's a feeling that they need to get more out of their data not just for their own use but for the *interaction* between groups. That's how a group like my team really helps: we can step across and not only help bridge those silos, but also bring new techniques forward and help bring those folks who are already used to doing analysis up on those techniques. It's important that you understand what an analysis is doing for you and to you to use data effectively in decision making.

This work changes the conversation that IT has with the business units that it works with. In some cases it changes the perspective of the *value* that IT brings. We're used to being sought after for technical solutions of a different type — for the software, hardware and service that we provide to support the business units. It's different to be sought after for the *answers* that we can provide.

So how has Monsanto's use of analytics and data changed?

Five years ago, people would have viewed analysis as almost synonymous with reporting. That work is critical, but being able to take the broader view and doing the analyses to support hypotheses that impact the broader view is what's different.

In the end, you need the best information possible for a variety of decisions that range all the way from daily ops to strategic planning. And the level of sophistication that you need to generate analyses differs based on the problem that you're trying to solve. That said, the simplest choice that works is always the best one.

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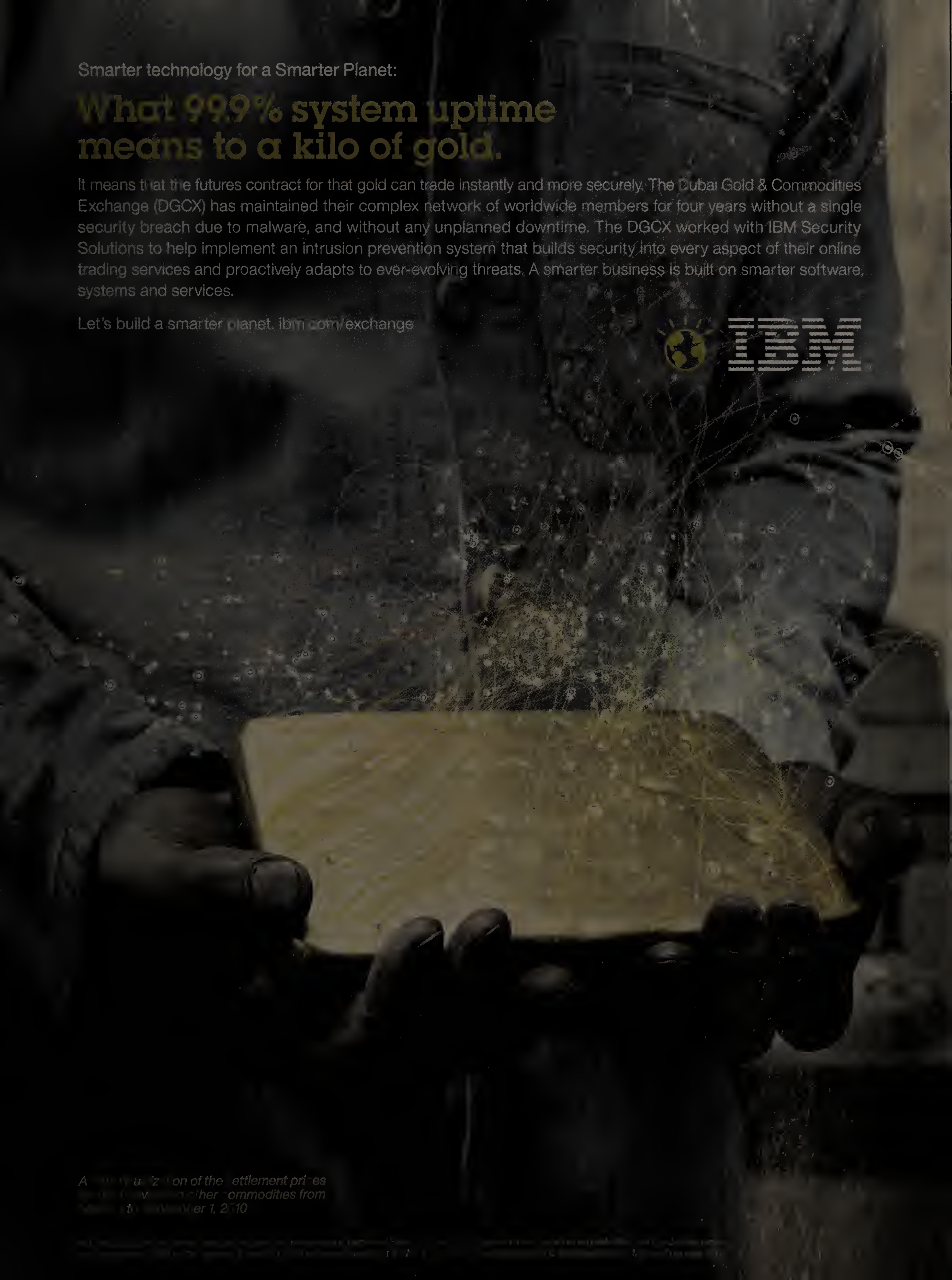

Smarter technology for a Smarter Planet:
What 99.9% system uptime means to a kilo of gold.
It means that the futures contract for that gold can trade instantly and more securely. The Dubai Gold & Commodities Exchange (DGCX) has maintained their complex network of worldwide members for four years without a single security breach due to malware, and without any unplanned downtime. The DGCX worked with IBM Security Solutions to help implement an intrusion prevention system that builds security into every aspect of their online trading services and proactively adapts to ever-evolving threats. A smarter business is built on smarter software, systems and services.
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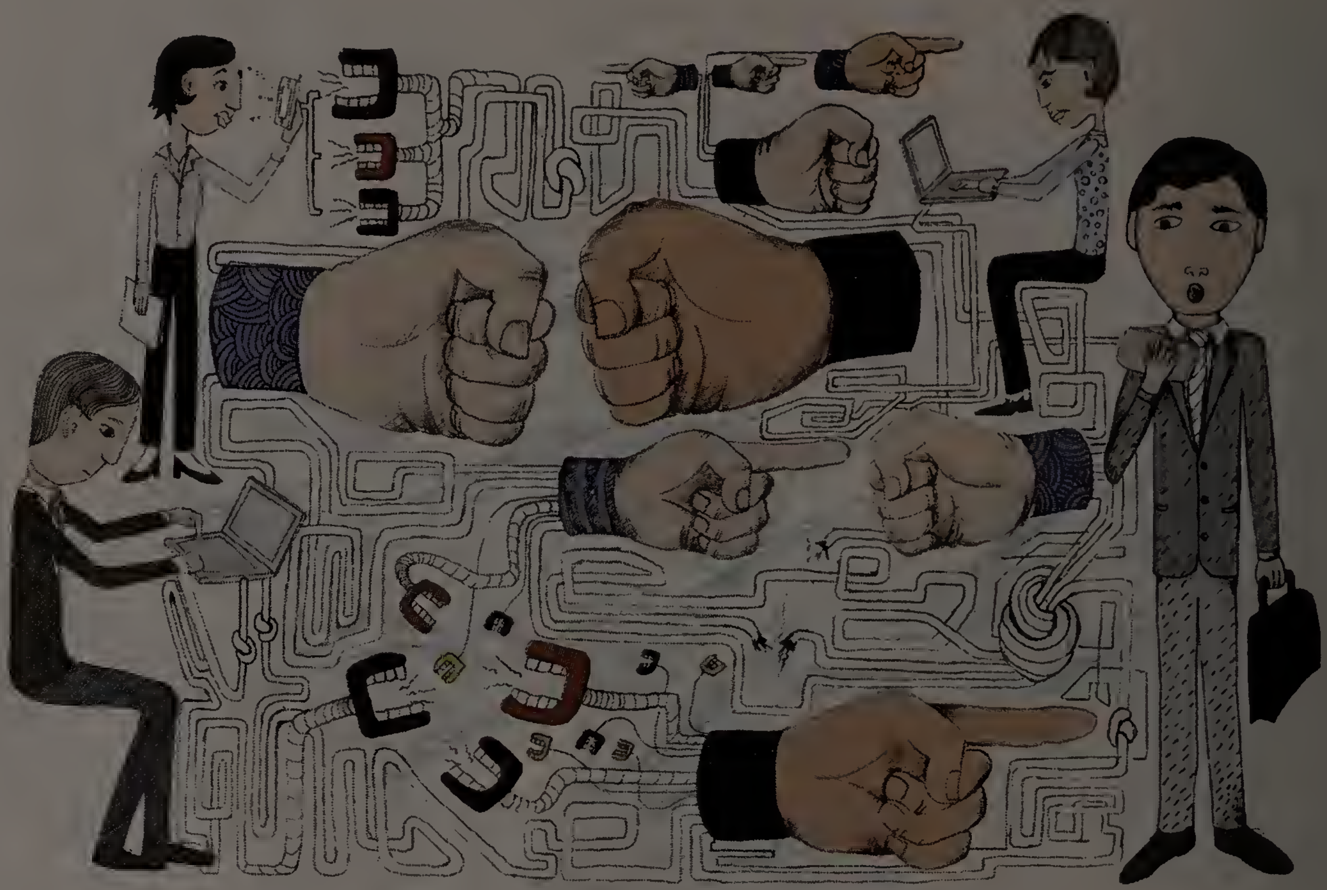
"You need the best information possible for a variety of decisions that range all the way from daily ops to strategic planning."



That's very interesting. How did you come to that conclusion?

In individual solutions, the tendency is to beat the bushes to wring out everything you can. But the efficiency of that solution may not be enough to warrant the effort. So you have to exercise judgment. We do that by always starting with a baseline that's either the existing methodology or the simplest solution possible. We generate that first, and then everything else we do is an effort to beat it.

What has surprised you as you've done this work over the last couple of years?

About two years ago there was a recognition that we're a data-rich company, but to some degree there was still some "sitting on the edge of the pool" in terms of analytics while we were assessing all the components we would need to have in place to bring this capability forward. Our new hypothesis was that maybe you don't need to have *everything* in place in order to start.

We did some work in sales forecasting which didn't really take that much effort, but it really helped our sales organization improve their forecast accuracy early in the season. It doesn't take long to do the analysis, and the return is huge. So our hypothesis was proven out. That's a big learning.

Operationally speaking, the amount of time that we actually spend prepping data versus doing the analysis seems surprising. For the exploratory work, maybe we spend three-fourths of our time getting the data ready and another quarter of our time selecting the analysis, running it, and interpreting it. But we can complete these projects on a relatively short cycle, and the benefit that is gained in a really short time period is just phenomenal. Using analytics itself to figure out what data elements we need to go after and first making sure that those are correct can narrow the field of high-value targets enough that it's something that people can start to get their heads around and plan for.

Do you think this kind of burgeoning, centralized analytics capability should be housed in IT?

Yes, I do. The reality is that IT has always been a great place to be for perspective into the different business domains. When you underscore that with the implementation capability that being in an IT organization can bring, it is a natural fit.

There are really some great analytical minds at this company in many different business units. They network informally together, and we have both formal and informal relationships with a variety of the people doing analysis all over the company. I would say that the only formal cross-business-unit analytics capability is fixed in IT. However, having a centralized analytics capability doesn't mean it's diminished at the point of need. They augment each other. In fact, we actually accelerate the efforts of others.

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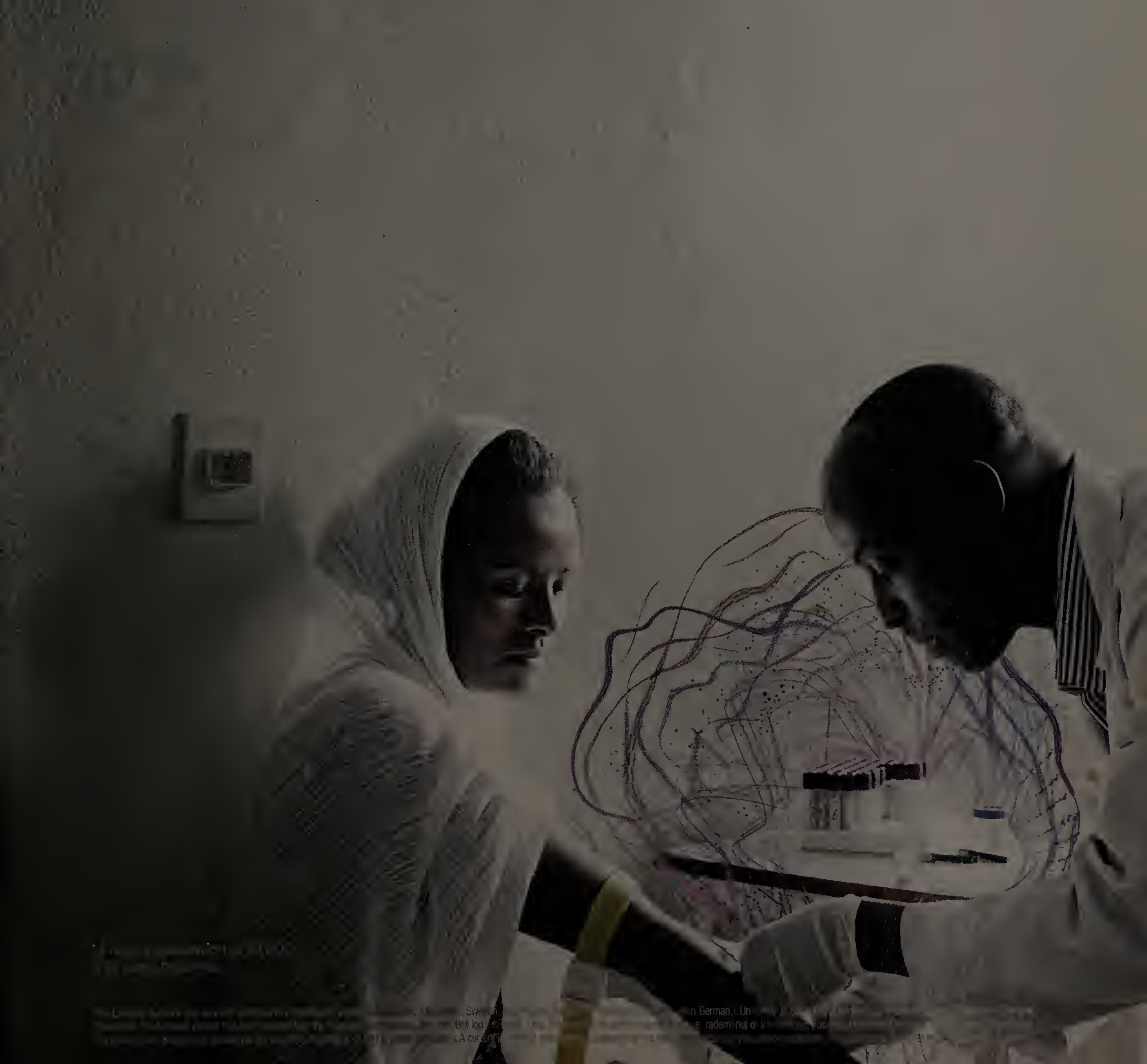

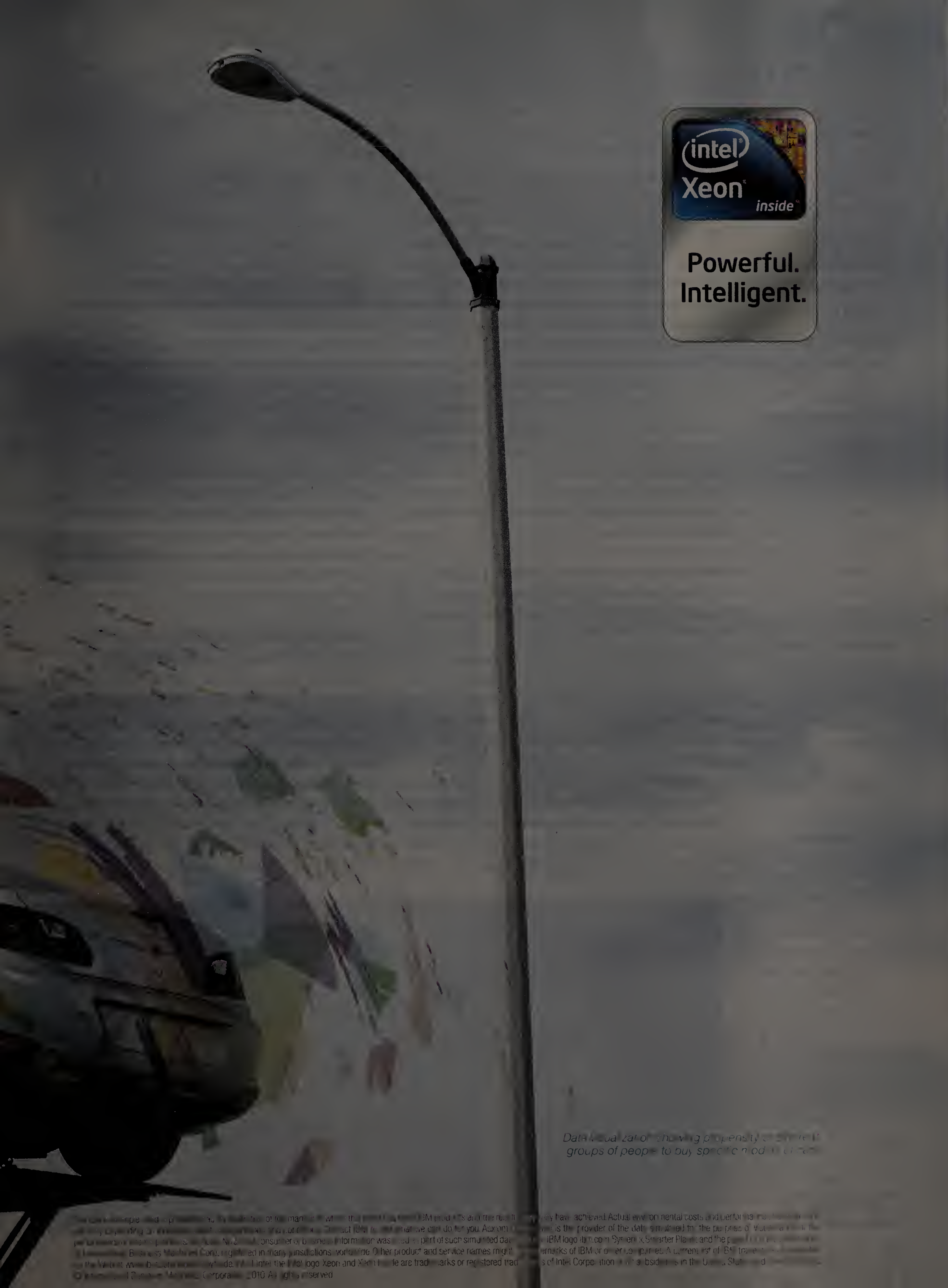
intel
Xeon
inside
Powerful.
Intelligent.

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"The best leaders are inquisitive and resourceful in their use of data and the talent to analyze the data, but also decisive and willing to take the action based on data."

In your view, how is the changing nature and availability of information and the changing nature of analyzing it going to alter how companies work?
The expectation of having analytical results available to make a decision early on is increasing. As higher quality information becomes available faster, we need to be poised to make decisions faster and take action as well. And I think that means that you have to have some different skill sets available to design and execute analyses.

You can acquire capability in terms of the computational power that's required to generate some analyses. But you also have to invest in the talent within your organization that really understands what the analyses mean and can think about things objectively. The value of having a group in information technology is that they can step back from the individual business units and think about the problems and solutions objectively and in broad context.

We've seen that sometimes people in positions of power don't want to cede their instincts to analytically-driven insights. Have you encountered that?
It's interesting. You see a variety of responses to the group, everything ranging from, "Wow, this is awesome, we needed a group that we could turn to for help with these things," to some self-consciousness and concern about the analytical effort being an evaluation methodology.

We typically get past that by collaborating deeply and closely with the business unit that we're working on a solution for. They learn as they work through these solutions with us, and that improvement in their knowledge base translates out into their organization in a ripple effect. In the end we don't want to own the model, we want that *group* to own the model. What starts off as fear can become pride of ownership and the ability to work with the answers.

Do you think leaders are going to need to be different, or differently capable, in the age of the new intelligent enterprise?
Leveraging data and analytical capability is an expression of resourcefulness, and it's something that you can't afford to fall behind on. If you don't like math and analyses, then you may try to avoid it to some degree, but you're going to be impacted. The best leaders are inquisitive and resourceful in their use of data and the talent to analyze the data, but they're also decisive and willing to take action based on data. In the transition from intuition-based decisions to data-driven decisions, that's really the huge difference that this capability brings: the confidence to make those decisions. I think the willingness to look at it from that perspective will help leaders be effective.

What impediments do you expect to encounter as these changes become more widespread?
Sometimes we see some hesitance, based on a preconceived notion that people won't understand how you got the answer. We really try to help familiarize people so that they don't walk away from a solution because they're afraid they won't understand how it got there. It's important for folks to realize that while sometimes it requires highly skilled talent to combine analytical techniques to arrive at an answer, everyone — absolutely everyone — is qualified to ask questions. Once people start doing that, they start to lose the discomfort. ■

Continued from page 20

software as needed, rather than going to the trouble of figuring out if we had additional licenses to spare." The company recently deployed CA's Software Compliance Manager, which automatically checks software usage against vendor licensing agreements.

CA's DSM also includes a metering tool that reports not only on used and unused licenses, but also on licenses that haven't been executed within a predefined time frame. "This will enable IT to harvest licenses that are just sitting on someone's desktop and redeploy them," says Crisp.

Asset management tools need to be backed up by organizational practices such as systematic enforcement of software retirements, says Snyder. Otherwise, data center administrators may keep an old system running while a new system is being tested and deployed but then forget to delete it, he adds. Be aware, too, that some software packages don't remove everything from the registry when you delete a program, or they may allow two versions of the same program to coexist.

Baker Hughes recently instituted a practice of assigning software to computers rather than to individuals, Crisp says. "When we decommission a computer, we harvest all software associated with it and reuse it more effectively," he notes. The payback: Microsoft enterprise license usage has stayed flat, even though the company has purchased additional machines and equipment, Crisp reports.

Centralizing software administration has enabled Crisp's group to accurately charge business units for software costs. Further, "it definitely helps us get volume discounts," he says.

However, asset management tools have yet to catch up with per-usage pricing models offered by SaaS and virtualization vendors, cautions IDC's Konary.

Time to Bargain

Providing usage statistics to a vendor can give you leverage at the negotiating table — as long as you know how to bargain. For example, if your vendor insists on invoking a contract clause that penalizes you for giving back unused licenses, ask if you can reallocate the cost of those licenses to other products that you do need, Altimeter's Wang advises.

One way you can get your enterprise software vendor to listen is to mention that you're considering going with an alternative product, such as an open-source or SaaS offering.

Mosaic, an Omaha-based organization serving people with intellectual disabilities, wound up going with open source even though it hadn't originally planned to do so. As part of a desktop virtualization project, the nonprofit compared existing Microsoft products to Linux alternatives and found that the latter offered major savings in license fees, in-house IT infrastructure needs and staff costs, says Thomas Keown, data storage and security administrator at Mosaic.

Keown conservatively estimates that moving to open-source software has saved Mosaic $465,000 annually, or about 19% of its IT budget. The organization has about 1,500 users nationwide.

But IT decision-makers should thoroughly evaluate the cost-benefit trade-offs of an alternative type of software. While moving to open source was the right choice for Mosaic, "every company has to do its own evaluation" of license, deployment, maintenance and support costs, Keown says. Particularly in larger companies, integrating open-source software with existing IT systems can be a problem.

Support can also be an issue, says Wang. If you're installing Linux software and you don't want to pay for outside help, he says, "you need a team that's trained in Linux software development." And make sure any open-source product you're considering has an active online support community. "Look at forums and bulletin boards and see how fast someone responds when you post an issue," he says.

SaaS, too, can provide significant cost savings over traditional software offerings, but it isn't a slam-dunk for all companies.

For small and midsize organizations, a hosted solution provides access to high-end systems and expertise they might not be able to afford otherwise, says Wang. For example, when 20/20's Warren evaluated tools for building a customized CRM system, he found that Force.com would cost about 75% less than a comparable packaged offering. Factors that drove up the cost of an on-premises product included licenses and the need for in-house IT infrastructure to support the software.

However, a large enterprise often already has most of the IT resources needed to support a new application. Further, it can depreciate the underlying hardware — which it can't do with monthly SaaS fees.

Of course, SaaS providers are just as profit-oriented as traditional software vendors and can be hard bargainers themselves, says Warren. For instance, Salesforce.com offered a discount in return for 20/20 agreeing to purchase both developer and end-user licenses as soon as the contract was signed. But development stretched out for two more months, during which time 20/20 paid maintenance and support for end-user software it wasn't using. "We probably should have held out for buying the end-user licenses once the development was completed," says Warren.

Moreover, customers that expect SaaS to be strictly pay-per-usage are often disappointed, says Gartner's Snyder. In exchange for a good deal, "many providers want a three-year agreement with a guaranteed minimum usage," he says.

Even if you're not ready to go with an alternative like SaaS or open source, it doesn't hurt to let your vendor know that you're exploring those options, says Snyder. Vendors will be more willing to negotiate seriously "when true competition is a factor," he adds.

Not Too Rough

But don't treat your vendor like an enemy. Hard-nosed negotiating is fine up to a point, but "price and licensing discussions are very much part of a long-term relationship," Konary says.

"You may get the best price in the world," says TMP's Jefferson, "but if you alienate your vendor, you may not get the support and service you need."

For example, TMP went through a workforce reduction recently, but the company's contract with Microsoft didn't allow it to reduce the number of licenses it paid for to reflect the decrease in the number of end users. Nonetheless, Microsoft agreed to renegotiate the three-year agreement so TMP wouldn't have to pay for the licenses it wouldn't be using, Jefferson notes. He gives the economic downturn partial credit for the software giant's willingness to cut TMP some slack. More important, however, was TMP's partnership with Microsoft. As part of that relationship, Jefferson says, "we put all our cards on the table" and keep the vendor fully informed of business plans and software needs.

TMP does that with all of its vendors, Jefferson says: "We'd bring them in and say, 'Here's what we're doing; we need to maximize our spend.' Often, they come up with innovative solutions." ◆

Horwitt *is a freelance reporter and a former* Computerworld *senior editor. Contact her at ehorwitt@verizon.net.*


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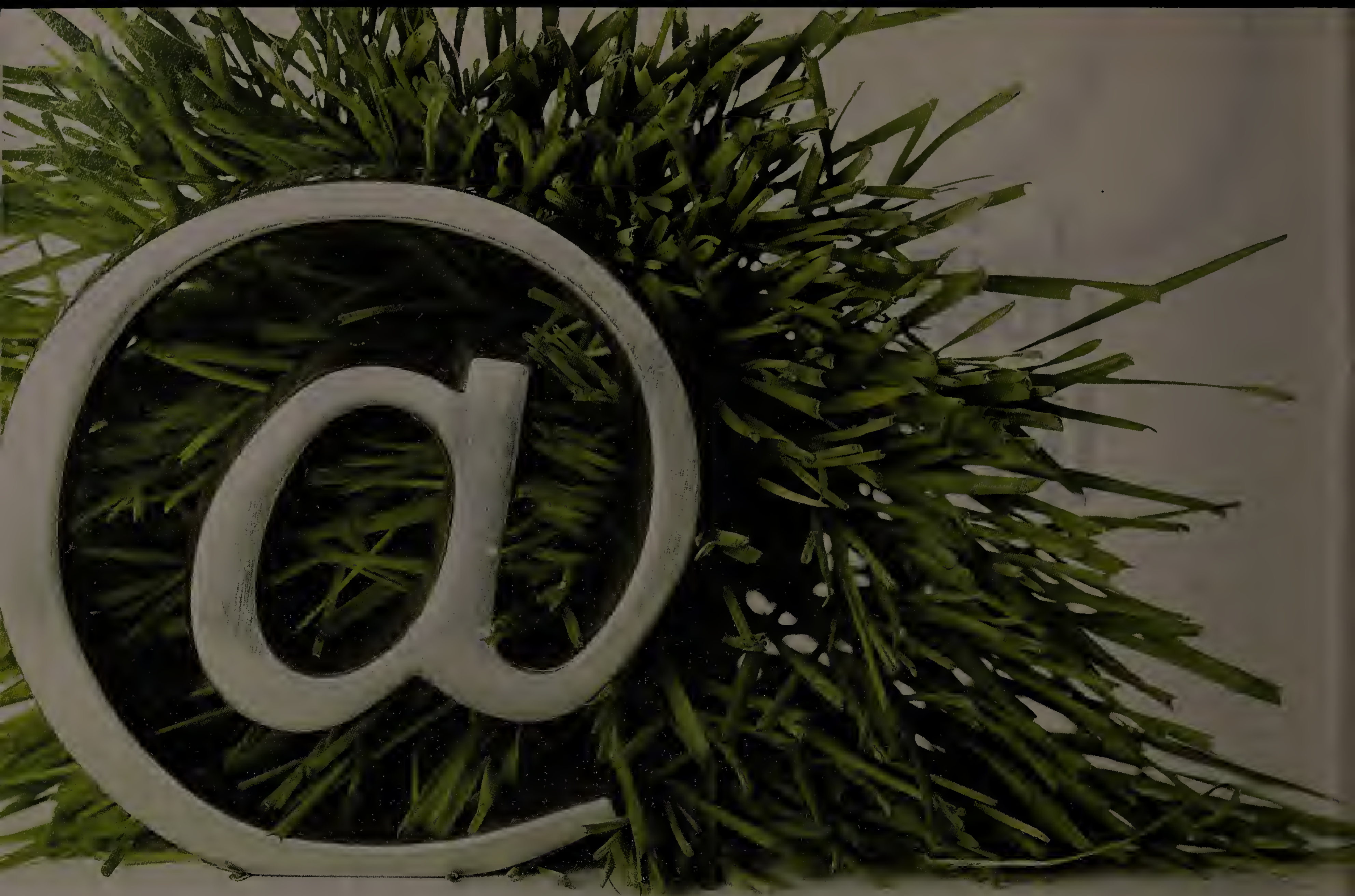

Networks CAN BE Green TOO

More-efficient network equipment designs could soon help reduce data center power and cooling costs.

BY ROBERT L. MITCHELL

NETWORKING

SERVERS GET MOST OF THE GLORY when it comes to energy management, but networking gear is about to catch up.

Over the past year, network equipment vendors have begun to emphasize energy-efficiency features, something that was never a top priority before, says Dale Cosgro, a product manager in Hewlett-Packard Co.'s ProCurve network products organization.

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5 Ways TO GREEN YOUR NETWORK

1 REFRESH YOUR EQUIPMENT. Cisco estimates that the energy efficiency of its products improves 15% to 20% every two to three years. The energy savings alone aren't enough to justify buying new equipment, but improving efficiency is one of [illegible] reasons for keeping your refreshes on schedule.

2 MAKE USE OF ENERGY-EFFICIENT FEATURES. These features can vary by vendor — or even by model — so check before you buy. For example, Cisco's Nexus 7000 switch can reduce power consumption in empty line card slots, but that feature is not yet available in the vendor's more popular Catalyst 6500 series. Other vendors, such as Hewlett Packard, allow you to turn off unused ports, but the process is a manual one. Juniper [illegible] administrators cut power to unused ports, but only by writing a script that lowers the power once a certain activity threshold is reached.

3 VIRTUALIZE. Server virtualization increases network utilization and reduces network equipment needs by allowing multiple virtual servers to share one or more network adapters within the confines of a single physical server. On the switch [illegible] Cisco's Virtual Switching System allow one [illegible] which means more than one server [illegible] port. This works because most organizations [illegible] capacity based on peak loads. Reducing the [illegible] number of physical ports required lowers overall power consumption. Similarly, HP's Virtual Connect technology abstracts HP server blades from Ethernet and Fibre Channel networks. It requires fewer network interface cards, reduces cabling requirements and increases network utilization.

4 BE CAREFUL WITH CABINETS. Make sure networking equipment that goes into a hot aisle/cold aisle row uses front-to-back airflow, not side-to-side cooling. Vendors prefer side-to-side venting, which allows them to get more equipment into the rack, but units using a side-to-side design may blow hot air back into the cold aisle – or directly into an adjacent rack, overheating it. If the vendor doesn't offer switching equipment that supports front-to-back airflows, you'll need to retrofit the cabinet with a conversion kit, available from vendors such as Panduit Corp. and Chatsworth Products Inc., which redirects it for use in a hot aisle/cold aisle configuration.

5 USE A STRUCTURED NETWORK DESIGN. Your best bet for the greatest energy efficiency is to follow the Telecommunications Industry Association's TIA-942 Telecommunications Infrastructure Standard for Data Centers, says Rockwell Bonecutter, global lead of Accenture's green IT practice. The specification locates networking equipment in a main distribution area, which ultimately connects to servers, storage and other IT equipment in individual racks.

– ROBERT L. MITCHELL

Networking infrastructure isn't in the same class as servers or storage in terms of overall power consumption — there are far more servers than switches — but networking can account for up to 15% of the total power budget.

And unlike servers, which have sophisticated power management controls, networking equipment must always be on and ready to accept traffic.

Also, networking power use at the rack level is significant. A Cisco Catalyst 6500 series switch consumes as much as 2kW to 3kW per 42U-high rack. Cisco Systems Inc.'s largest enterprise-class switches, the Nexus 7000 series, can consume as much as 13kW per rack, according to Rob Aldrich, an architect in Cisco's advanced services group. A 13kW cabinet generates more heat than many server racks — enough that it requires careful attention to cooling.

By way of comparison, most data centers top out at between 8kW and 10kW for server racks, says Rakesh Kumar, an analyst at Gartner Inc. The average cabinet consumes about 4kW, says Peter Gross, vice president and general manager of HP Critical Facilities Services.

Vendors have already adopted some energy-related features, such as high-efficiency power supplies and variable-speed cooling fans. But with switches, there's a limit to what can be done in the area of power management today. Most idle switches still consume 40% to 60% of maximum operating power. Anything less than 40% compromises performance,

> **If something is not right [in the data center], you want to know about it before a catastrophe happens.**

ROCKWELL BONECUTTER, GLOBAL LEAD, GREEN IT PRACTICE, ACCENTURE LTD.

says Aldrich. "Unless users want to accept latency, you have to have the power," he adds.

But huge improvements are coming, says Cosgro.

More-Efficient Technology

Technology improvements that favor energy efficiency are gradually emerging in several areas. "As new generations of products hit the market, more of these kinds of features will be implemented," says Cosgro.

Some examples include more modular application-specific integrated circuit (ASIC) designs that allow switches to turn off components not in use, from LED panel lights to tables in memory.

Also, general advances in silicon technology will minimize current leakage and gradually boost energy efficiency with each new generation of chips. Eventually, says Cosgro, "we should be able to get networking equipment that uses 100 watts today down to 10 watts."

Improvements in other areas have also helped. Software, for example, is now more efficient, consuming fewer CPU cycles -- and less energy. And hardware is now designed to run at higher operating temperatures to reduce cooling costs.

For example, Cosgro claims that HP's current ProCurve equipment can run safely at temperatures up to 130 degrees — higher than the specifications for most other data center equipment. "That's driven by requirements of IT managers who want to run data centers at higher temperatures," he says.

It may be possible to move to higher operating temperatures in a single-vendor wiring closet, but network equipment vendors will need to do a better job of testing in mixed environments before temperatures approaching 130 degrees can be sustained — especially within racks in the data center. "No one knows how networking and other types of equipment will react when sitting next to servers that displace more BTUs," says Drue Reeves, an analyst at Burton Group. Today, each vendor tests with only its own equipment.

More sophisticated power-monitoring systems will also help save energy, as will management tools with more granular controls.

Real-time power and temperature monitoring is key to any data center and is essential for managing growth. "If something is not right, you want to know about it before a catastrophe happens," says Rockwell Bonecutter, global lead of Accenture Ltd.'s green IT practice.

Management software could be configured to identify specific network equipment, such as voice-over-IP phones, by using the Link Layer Discovery Protocol. The software could then automatically shut off Power-over-Ethernet current for VoIP handsets at a specific time of day or when the associated PC on each desktop is turned off at day's end.

Another example: Edge switches are typically connected to two routers for redundancy during the day, but a network could be configured to have one router go into low-power sleep mode at night. The sleeping router would "wake up" only when or if it was needed.

These types of applications represent "a huge opportunity for savings," says Cosgro.

Better Standards

Emerging standards could soon help save energy during periods when networks sit unused and will help IT compare the relative efficiency of competing products.

The new IEEE P802.3az Energy Efficient Ethernet (EEE) standard, approved on Sept. 30, may offer the biggest bang for the buck by cutting power consumption for network equipment when utilization is low.

Today, Ethernet devices continuously transmit power between devices, even when network traffic is at a standstill. Equipment supporting the EEE standard will send a pulse periodically but stay quiet the rest of the time, cutting power use by more than 90% during idle periods.

In a large network, that's "a whole lot of energy" that could be saved, Cosgro says.

The standard will allow "downshifting" in other modes of operation as well. In a 10Gbit switch, for example,

Continued on page 36

DATA CENTER **Energy Stats**

How much power does gear in the data center consume?

- **Cisco Catalyst 6500 series switch, fully populated:** 2kW to 3kW per rack
- **Cisco Nexus 7000 series switch, fully configured:** 13kW per rack
- **Fully loaded rack of servers, average load:** [illegible]

SOURCES: CISCO, HP CRITICAL FACILITIES SERVICES

“Most people will not save enough energy in the short run to justify replacing their equipment. Stay on your regular life cycle.

DRUE REEVES, ANALYST, BURTON GROUP

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individual ports that are supporting only a 1Gbit load will be able to drop power down from 10Gbit/sec. to what's required to support a 1Gbit/sec. configuration, saving energy until activity picks up again.

Products built to support the EEE standard should start appearing by 2011, says Aldrich.

Another emerging technology, the PCI-SIG's Multi-Root I/O Virtualization specification, gives servers within a rack access to a shared pool of network interface cards. This happens via a high-speed PCI Express bus — essentially extending the PCIe bus outside of the server. "Instead of a [network interface card] in every server, you'll have access to a bank of NICs in a rack, and you can assign portions of the bandwidth of one of those NICs to a server," probably using tools provided by the server vendor, says Reeves.

Energy savings will come from increased utilization of the network — achieved by splitting up the bandwidth in each "virtual NIC" — and the need for fewer NICs and switch ports, he says. He expects to see standards-compliant products perhaps as early as 2012.

Energy-Efficiency Ratings

Finally, standardized measurements of energy efficiency have started to appear on some networking equipment. Juniper Networks Inc., for example, includes the Energy Consumption Rating on the data sheets for some of its products. ECR is a draft specification, created by the ECR Initiative consortium. Lawrence Livermore National Laboratory, Ixia and Juniper developed the specification, which measures performance per energy unit for networking and telecommunications equipment.

Both Cisco and Juniper are backing the Alliance for Telecommunications Industry Solutions' Telecommunications Energy Efficiency Rating specification, which ATIS introduced last year.

However, neither specification has been universally accepted. Juniper supports ECR but doesn't include the rating on all of its products' data sheets. Cosgro says HP hasn't included either of those energy-efficiency standards in its data sheets because users don't understand the metrics. "What they care about is the number of watts used," he says.

Another strike against the specifications, Cosgro says, is that they lack a detailed, open rating methodology. That means vendors can choose rating firms that use methodologies that best suit their needs.

A truly open specification isn't likely to appear until next year at the earliest, when the Environmental Protection Agency starts work on an Energy Star rating for large networking equipment.

The agency announced an Energy Star specification for data centers in June and plans to eventually develop specifications for data center UPSs and cooling systems, according to a spokesman. These new specifications, which will cover everything from power supplies and internal chips to Energy Efficient Ethernet, will be "the key energy-efficiency standard" going forward, Cosgro says.

The easiest way to increase energy efficiency is to buy new equipment, but that's not necessarily a practical option, because network administrators making purchasing decisions must consider other factors besides potential energy savings — such as the remaining useful life of their current equipment. A 15% cut in energy costs may add up when spread across thousands of servers, but the total savings would be much smaller on a few racks of switches.

Even for a single rack, the cost per kilowatt usually won't justify an upgrade. "Most people will not save enough energy in the short run to justify replacing their equipment," warns Burton Group's Reeves. "Stay on your regular life cycle." ◆

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Keyword Searches DISAPPOINT

Lawyers are using **old search technologies** that don't find all of the relevant documents. **BY CINDY WAXER**

"DOCUMENT DUMP." "Unsearchable morass." That's how Ontario Superior Court Justice Cary Boswell described the nearly 23 million pages of electronic records handed over by the prosecution in an ongoing criminal fraud case of three former Nortel Networks executives.

During a hearing last December, defense lawyers argued that the sheer amount of material provided on a hard drive — the equivalent of 8,000 to 10,000 boxes of paper — was so "staggering" and disorganized that it couldn't be effectively searched for information that might help the defendants.

In a ruling afterward, the judge agreed, ordering the prosecution to "re-disclose" any relevant material in a more organized fashion.

That case offers an example of the challenges legal professionals face with e-discovery. And those difficulties are compounded by the fact that typical computer searches don't find all of the relevant information in a data dump. For example, tests by the Text Retrieval Conference (TREC), an international workshop that assesses various information retrieval approaches, show that Boolean keyword searches locate only 22% to 57% of the total number of relevant documents.

"If you're conducting searches electronically, you're never going to be able to say that you turned over every stone," warns Susan Wortzman, a partner at Wortzman Nickle PC, a Toronto law firm specializing in e-discovery.

One problem with today's search tools is the prevalence of false positives. Keyword searches retrieve all the documents containing a specified term, regardless of context. The result is a collection of files that are often irrelevant to a legal team. For example, a search for the word *record* could turn up documents related to a Beatles album, a Guinness world record or a recorded message.

But that's not all. Documents containing inadvertent misspellings can easily fall through the cracks of a standard keyword search. Then there's the inherent ambiguity of language, the combination of text and images, and the introduction of errors by optical character recognition software — all factors that can significantly impair the e-discovery process.

"Keyword searching is a blunt instrument," laments Patrick Oot, co-founder of the nonprofit Electronic Discovery Institute and former director of electronic discovery at Verizon Communications Inc.

The Human Factor

One way to improve document searches is to put a human expert — who knows the topic and terminology — in the loop, says Gordon Cormack, coordinator of TREC's legal track and a professor of computer science at the University of Waterloo.

"You can do a lot better job of searching for relevant documents if you use a combination of an expert who knows the data set working with individuals who are actually running automated search queries," agrees Jason Baron, director of litigation at the U.S. National Archives and Records Administration and a founding coordinator of the TREC legal track.

> **We have vast needles in haystacks,** and we're not using state-of-the-art search techniques to find them.
>
> **GORDON CORMACK,** COORDINATOR, TEXT RETRIEVAL CONFERENCE LEGAL TRACK

Meanwhile, vendors are scrambling to provide alternative search technologies to overcome the limitations of today's tools. E-discovery software vendor Clearwell Systems Inc., for example, has developed what it calls "transparent search," which lets users select specific variations of keywords to reduce the likelihood of false positives.

With Clearwell's tool, a user could conduct a keyword search for, say, the word *false* that catches derivations such as *falsify* and *falsifying* while excluding irrelevant terms, such as *falsetto,* that a standard keyword search might include.

Another alternative is "concept search" technology that retrieves information related to a concept rather than a keyword or phrase. For example, a concept search based on the word *oil* would recognize that documents about petroleum are also relevant.

"Conceptual technology is a much more effective tool than keyword searching," says Oleh Hrycko, president of H&A eDiscovery in Toronto. H&A offers a search engine called eExamine Conceptual that groups together documents that address related concepts. The company says the tool cuts search time by up to 70%.

Other search technologies rely on taxonomies of industry terms, or mathematical techniques (such as clustering and latent semantic indexing) that determine the probability that a document has a particular term or concept.

Ultimately, the best approach might be a combination of the new search technologies. "A startling statistic one of our studies revealed is that 25% of relevant documents were found by Boolean search, while 75% were found by using other methods combined," says Baron.

Despite the increasing availability of more advanced search technologies, the new tools aren't being snapped up by old-school law firms. "In terms of comfort, the more senior practitioners might pine for the good old days when they had boxes of documents [to search through]," says Richard Braman, executive director of The Sedona Conference, an e-discovery think tank in Arizona.

For now, the outcomes of court cases all too often hinge on old-fashioned keyword searches. Warns Cormack: "We have vast needles in haystacks, and we're not using state-of-the-art search techniques to find them." ◆

Waxer *is a freelance writer in Toronto. You can contact her at cwaxer@sympatico.ca.*

Security Manager's Journal

MATHIAS THURMAN

Trouble Ticket

» Early tasks at the new job include evaluating the security of the company's many software-as-a-service relationships.

» Action plan: Identify all the weak points and then write a remote-access policy that will address most of them.

Tightening Up SaaS Security

Our manager's new company uses over 30 SaaS apps, which opens many doors to potential data compromise.

AFTER JUST a couple of weeks at my new post, I'm already finding plenty of things to do.

First up is following up on a plan to implement a SIEM (security incident and event management) tool. While my new company was looking for a replacement for its security manager, it hired a consultant to fill in. This interim manager initiated a SIEM proof of concept. I'm not keen on inheriting this selection, the problem being that a SIEM tool is only as good as the logs that are fed into it, but I don't want to risk losing an opportunity to enhance the security posture of the organization. I need to make sure we get full value from this investment, which will probably exceed $300,000. I will also be contacting references and negotiating the price. I'll probably have more to tell you about this project as it progresses.

Another issue vying for my attention early on is the company's heavy use of software as a service (SaaS). At my last company, we used four SaaS vendors. This company far exceeds that number, because it tends to choose a SaaS option ahead of either building applications in-house or buying them. As a result, we currently use more than 30 SaaS offerings. It's a nightmare from a security perspective, for many reasons.

For example, each SaaS relationship requires connecting some aspect of our trusted network infrastructure with the vendor's network. In doing this, security has been an afterthought. We're using a VPN, but that only addresses encryption. The associated firewall rules are pathetically weak, and in some cases the connections are wide open.

the discussions about security! **computerworld.com/blogs/security**

I also have a problem with single sign-on (SSO), since many of the SaaS tools that we are using can be accessed freely from the public Internet. I want access to be restricted to the company's trusted network. As it is, employees can access many of our SaaS applications from, say, an Internet kiosk in Moscow. People from outside of the security realm think I'm being paranoid when I say that I want more restrictions on things like survey tools and corporate travel sites. But it's not all about the content of the sites. With SSO, credentials that are compromised while accessing some innocuous SaaS site can put a good deal of our infrastructure and data at risk. And employees often do things that make compromise all too easy, such as clicking "remember my username and password" on a public computer or simply neglecting to sign off.

Tools of Compromise

But even if employees are well trained about security risks and don't do those sorts of things, there are still keyloggers, sniffers, screen-capture tools, cameras and other methods of capturing domain credentials. For example, we currently, change passwords every 90 days. That means that if someone were to capture an employee's enterprise credentials, the hacker would have as long as three months to figure out what other SaaS applications he could access. He would only need to do a quick query of our external DNS to discover our Outlook Web Access site, which currently isn't protected with two-factor authentication. What's more, many people these days (including me) use e-mail as a complete data repository, leaving all of that data — and their calendars, contact lists and personal notes — wide open to hackers who have the proper credentials.

Over the course of the next few weeks, I will write a policy on remote access that will include two-factor authentication and other ways of safeguarding access to our SaaS-based applications. If you have some advice, I would love to hear from you. ◆

> **When connecting our trusted network to the SaaS vendors' networks, security has been an afterthought.**

This week's journal is written by a real security manager, **"Mathias Thurman,"** *whose name and employer have been disguised for obvious reasons. Contact him at mathias_thurman@yahoo.com.*

OPINION

BART PERKINS

Bring Your Game!

> Video games are effective in sorting out new hires and training employees in new skills.

Bart Perkins is managing partner at Louisville, Ky.-based Leverage Partners Inc., which helps organizations invest well in IT. Contact him at BartPerkins@LeveragePartners.com.

APPLYING FOR A JOB? Polish your résumé and grab your DS. Research shows that video games offer a more effective method of determining which candidates to hire than personality tests. According to researchers F.L. Schmidt and J.E. Hunter, "work samples" and general mental ability tests are nearly twice as effective as other assessments. Cutting-edge organizations combine these two techniques in gamelike simulations that require candidates to demonstrate necessary skills and address job-specific problems. Candidates with the highest game scores are the most likely to be successful.

Games can also enhance training programs. McDonald's Japan partnered with Nintendo to develop eSmart, a DS-based training game that teaches new crew members how to clean workstations, cook food, take orders, serve customers and handle other common situations. It decreased training time from 45 hours to roughly 24 and eliminated the need for human trainers during introductory lessons. In addition, eSmart allows Wi-Fi-connected trainers to monitor individual progress and provide immediate feedback. ESmart has increased training program efficiency while significantly reducing costs. And games like eSmart can be modified quickly to reflect new skill requirements or changes in work tasks or processes.

Games can simulate many jobs for training or recruiting purposes. Repetitive jobs such as call center agent, bank teller and meter reader are easily simulated, as are many hands-on lines of work such as HVAC, auto and appliance repair. More complex games simulate the "soft skills" required of first-line supervisors and salespeople for moderately complex goods (mobile phones, cars, etc.). These games model how to build rapport, clarify technical information and resolve potentially uncomfortable situations such as conflicts.

Standardized personality tests have long been accepted HR tools. Games, however, must comply with government hiring regulations. In the U.S., candidate selection games must contain job-related content and provide a consistent experience for all applicants. Games that present different users with different challenges based on choices they make at certain points are prohibited. Training games face fewer restrictions: Different experiences are OK, as long as the game is used to improve job performance and isn't the basis for a promotion or a raise.

Not for Everyone

There are hurdles, however. Many companies have shied away, believing games to be frivolous time-wasters that are inappropriate in the workplace. And HR policies often specifically prohibit playing games on the company's time or computers. Additionally, people over 40 typically have limited gaming skills. (My daughter humiliates me at Mario Kart!) Older applicants may find games intimidating if they don't know how to use a Wii's A and B buttons or an Xbox's X and Y conventions. So qualified individuals with pertinent experience may be overlooked.

Well-designed games promote employee retention by providing candidates with accurate previews of job activities. Improved understanding sets realistic expectations and can cut short-term turnover in half. Games also create the perception that a company is a progressive, desirable and fun place to work, particularly for younger people.

Overall, games are good news for overworked and understaffed HR organizations. They're a highly effective way to identify the most promising candidates from a large applicant pool. In addition, training games provide hands-on practice for real-world situations — without the risk of spilling milk or dropping french fries. ♦

Career Watch

IT Security Loses Some Cachet

AFTER WEATHERING the economic turmoil of the past three years, IT certification pay premiums took a tumble in the third quarter, according to Foote Partners LLC's quarterly analysis of IT skills and certifications pay. David Foote, the firm's CEO and chief research officer, expressed surprise at the drop in compensation for security certifications in particular, noting that "security certifications pay has been on a steady upward climb since October 2006."

Foote Partners noted that the decrease in additional pay awarded to IT workers for security certifications does not mean that demand for such workers has declined, but rather that the supply-and-demand ratio has shifted. It could be that there is now a glut of certifications in the market, making it easier for employers to fill positions without increasing pay levels.

OVERALL, CERTS PAY WAS DOWN . . .

These IT certification categories posted decreases in overall pay premiums in the third quarter of 2010. A 1.3% average decline was found among a total of 221 certifications evaluated.

Web development	-2.7%
Systems administration/engineering	-2.2%
Networking and communications	-1.9%
Application development	-1.5%
IT security	-0.6%

. . . BUT SKILLS PAY WAS UP

These noncertified IT skills categories posted increases in overall pay premiums in the third quarter of 2010. A 0.7% average increase was reported among a total of 236 noncertified IT skills evaluated.

Operating systems	2.9%
Web/e-commerce	1.7%
Database	1.5%
Management/methodology/process	1.0%
Application development	0.5%
Systems/networking	0.4%
SAP and enterprise applications	0.1%

ASK A PREMIER 100 IT LEADER

Jinx Walton

The director of computing services at the **University of Pittsburgh** *answers questions about a colleague's negativity, the job market and leveraging an MBA.*

If you have a question for one of our Premier 100 IT Leaders, send it to **askaleader@computerworld.com**, and watch for this column each month.

I'm often thrown into projects with a co-worker who is down on everything that our boss and our company does. I've tried to help her channel her anger into positive things that could result in improvements, but she seems to just want to complain. It's wearying to work with her. What can I do? Your attempts to adjust your co-worker's attitude are admirable but obviously futile. It is unfortunate, but some individuals are happiest when they are complaining. Since you now know that she is not going to change, your time is best spent focusing on your tasks and limiting your interactions with her to those necessary to successfully complete projects. To keep her attitude from negatively impacting you, it is important that you distance yourself from her beyond those interactions required for the assigned projects.

I've been out of work for 19 months after eight years as a sysadmin. I'm ready to throw in the towel and find another line of work, except that I love working with technology so much. Any words of encouragement? I really need some. Your experience and love of technology should be key factors in your decision-making process. My recommendation would be that you not limit your search to IT positions that specifically match your background. Eight years as a systems administrator brings with it a wealth of knowledge that is applicable to a variety of technology-based positions. You might want to widen your search and look at all available IT positions and then modify your résumé to show how your experience and expertise apply. By taking the time to modify your résumé for each position, you are focusing attention on your strengths and assisting the employer by demonstrating how your experience fits and brings value to the position.

When the economy tanked, I left my job as director of a project management office and went back to school for an MBA. I recently finished the program. Any advice on how best to use my experience and new degree for a role with more leadership potential? An MBA is an invaluable credential to support your aspirations for increasingly responsible leadership positions. As a former director of a project management office, you already have credentials in an important leadership role. Leading an organization's project management activities provides high-level insight into the priorities and direction of the organization. I would capitalize on this experience, along with your academic credentials, during your job search.

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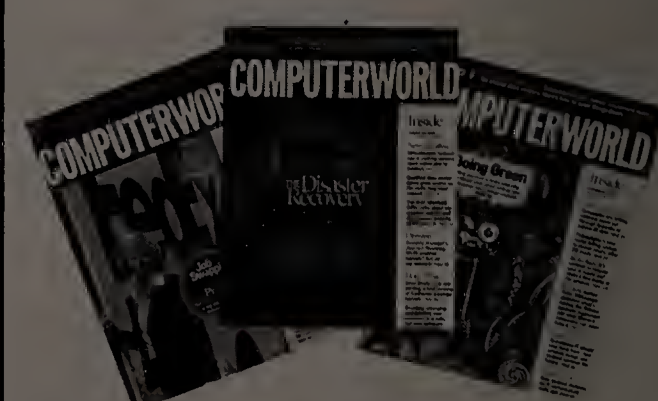

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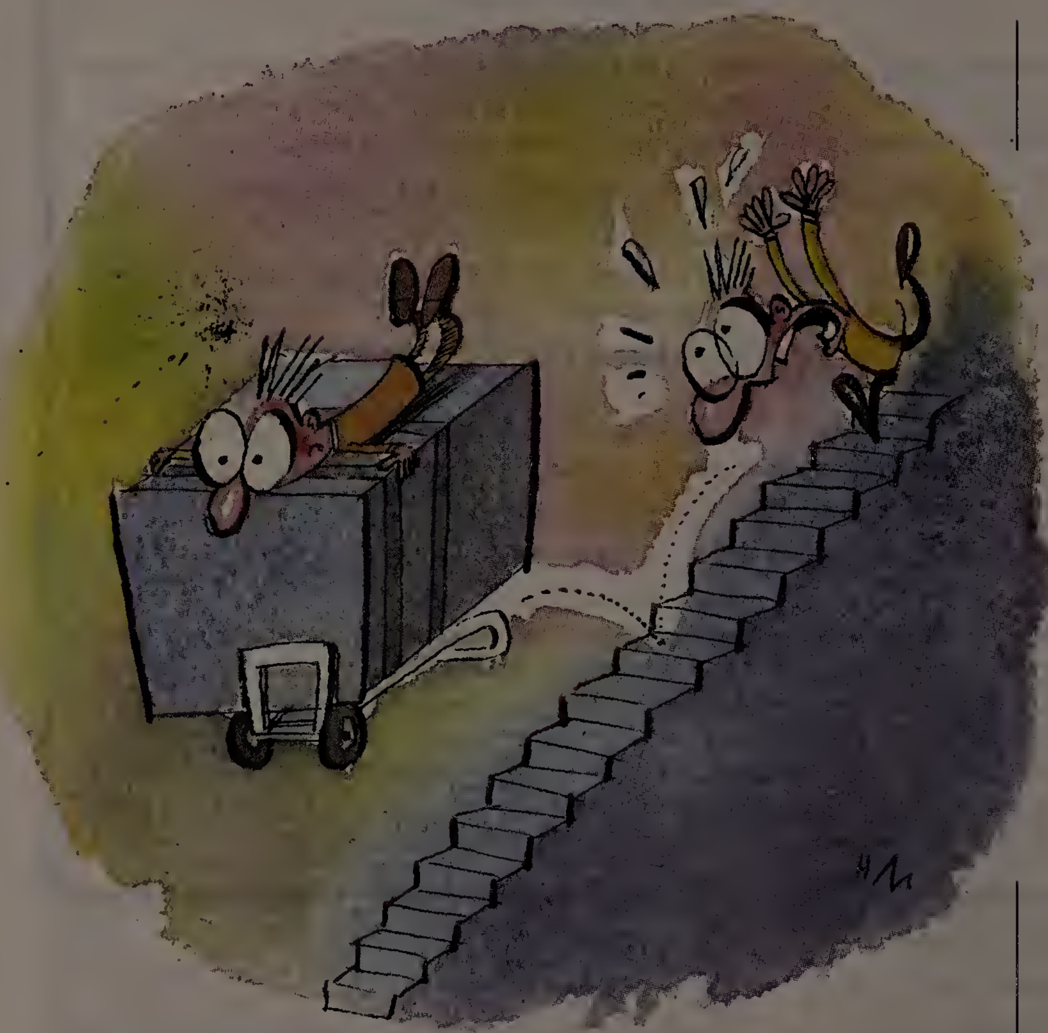

HAL MAYFORTH

Lasting Impression

A large server has to be moved from the ground floor to the second floor of the building where this IT pilot fish works – but it won't fit in the elevator. "The company decided to do the move on the cheap, so they hired two . . . let's just say 'typical' laborers," says fish. "They weighed at least 250 pounds each. They strapped the server to a cart and started dragging it up from the ground floor. Two steps from the top, the first guy slipped, and the server started bouncing down the steps. To stop it, the other mover jumped onto it, which slowed it enough for it to come to rest on the landing, with him still splayed out on the case. Obviously, we expected the worst. Surprisingly, it started right up with no problems. The only issue: a human-shaped dent in the case."

Wrong Impression

There's a job opening for an Oracle database programmer, and the interviewers want to see what this contractor pilot fish can do. "The technical architect illustrated the current design of his poorly performing and unmaintainable application," says fish. "He asked me what I would do to improve it." Fish starts to run down the improvements he'd make: Break the four enormous database packages down into a swarm of smaller pieces, then build a layered API to separate application logic from business rules from database calls. "I pointed up the fundamental flaws in the current approach, contrasting how the new approach solves all the current issues," fish says. "With a severe frown on his face, the technical architect told me, 'I designed this application.' The architect and the director both thanked me for coming in. Needless to say, I didn't get the job."

Mistaken Impression

This IT pilot fish at a hospital gets an e-mail from management that's sent to the whole staff: *Just a reminder that the daylight-saving time change occurs this weekend. We will once again "fall forward." Please remember to set your clocks ahead one hour on Saturday at midnight.* Fish sends a quick note back to the manager who sent the all-staff message: "Actually, daylight-saving time 'springs forward' and 'falls back.' The clocks will 'fall back' one hour this Sunday morning to standard time. At 2 a.m. the clocks will be set *back* one hour to 1 a.m. This will make it light earlier in the morning and dark earlier in the evening." That prompts a quick response from the manager: *Fred, you are so right. I'm the only person who will be falling forward. I was trying for that extra hour of sleep!* Sighs fish, "She still doesn't get it."

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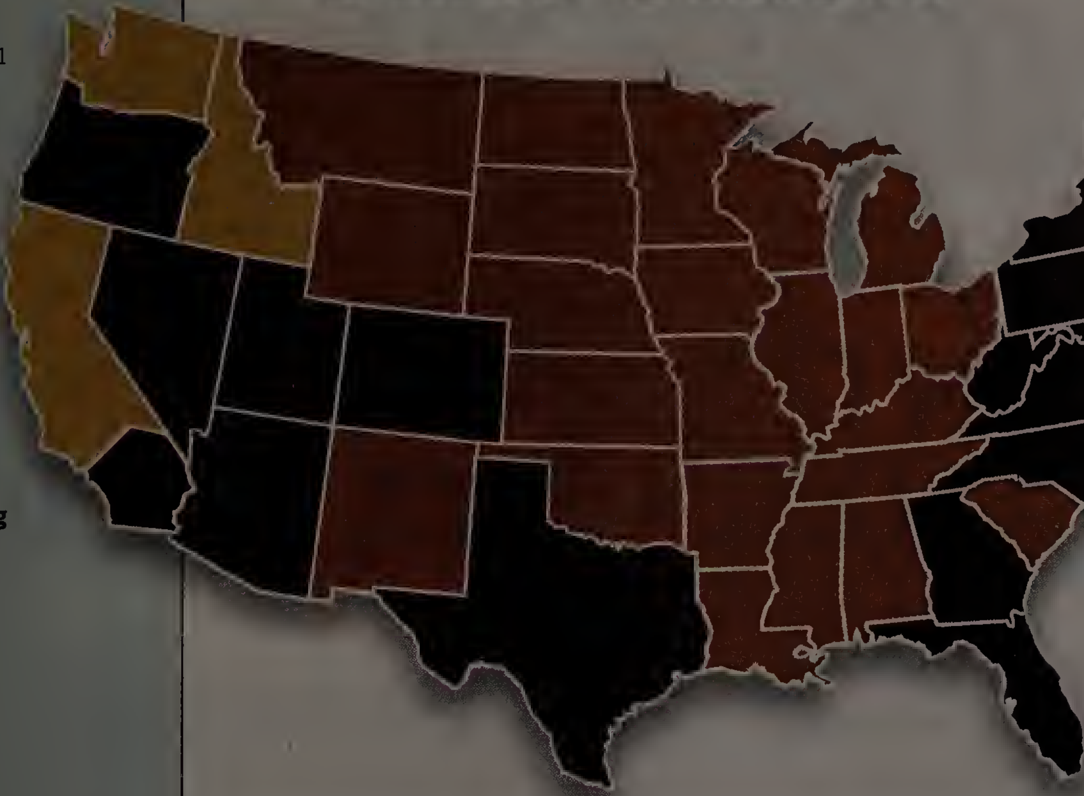

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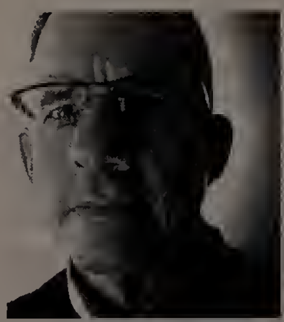

PATRICK THIBODEAU

How China Will Eat The U.S.'s Tech Lunch

China is very good at building big things, and supercomputers are becoming very, very big things.

YOU CAN SAY WHAT YOU WANT about the inefficiencies and lack of innovation in China's mix of capitalism and state planning, but the facts tell their own story. China now has the world's fastest supercomputer, a 2.5-petaflop system, and is completely focused on building an exascale system (roughly 1,000 times more powerful than a petaflop system), possibly as early as 2016.

Despite this, China is faulted for lacking the entrepreneurial and innovative culture to compete with Silicon Valley. Perhaps that's true — for now. But China is very good at building big things — think the Great Wall, for starters — and supercomputers are becoming very, very big things, soon to cost $1 billion or so each for an exascale system.

So what if the U.S. ends up dominating the tablet computing market? From China's perspective, it's more important to build systems capable of producing truly revolutionary breakthroughs that may lead to new industries and technologies.

China's ascension in the supercomputer ranks does not mean that the U.S. has lost its mega-advantage in the field. But there are three trends putting the U.S. on a second-best (or worse) path.

The first troubling trend is the lack of U.S. investment in clean energy. In June, the Pew Research Center reported that relative to the size of the country's economy, U.S. clean energy investments were lagging behind those of Europe, China and even Brazil. Pew wrote that "the United States is on the verge of losing its leadership position in installed renewable energy capacity, with China surging in the last several years to a virtual tie."

China is building schools; we are raising tuitions in response to budget cuts. China is investing in supercomputers, in part to propel its clean energy work; we are spending money on wars.

The second trend concerns the attack on innovation. The tech industry is consolidating, and this may be leading companies to focus on maintaining their market positions and finding new ways to lock in customers. Vendors are buying innovation by acquiring start-ups instead of, in some cases, spending money on their own R&D — and those acquisitions also reduce competitive threats.

The third problematic trend concerns our next Congress. The need for government support of scientific and engineering research is increasing at a time when this country is taking a harshly conservative turn. There is a belief that the private sector, unconstrained by regulations, will meet the national economic needs. What that will get us is more investment in drilling for natural gas, not green tech.

Supercomputers are built by national governments, not private industry, and without national leadership, they will not be built. They cost too much. The U.S. is spending more than $300 million alone on Blue Waters, a 10-petaflop system that's due next year. The U.S. has an exascale initiative, but Congress has yet to commit the billions it is likely to need. China has a plan, and it's already carrying it out.

The most important takeaway from this month's ranking of supercomputers in the latest Top500 list isn't that China has the No. 1 system, but that the U.S. has only five of the top 10 spots. That's new. The U.S. usually has seven in the top 10. Now, two of the 10 leading systems are in China; Japan, France and Germany have one each. What this list says is that the global race to build the world's most powerful systems is accelerating, and the U.S. doesn't have a lock on first place. ◆

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